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Troisieme Mémoire sur l'Asphyxie, considerée dans les Batraciens, par M. Edwards, Docteur en Médecine. (Lu à l'Academie des Sciences le 13 Juillet, 1818.)

(From the Quarterly Journal of Foreign Medicine and Surgery.)

In a Memoir which I had lately the honour of reading to the Academy, I undertook to examine the causes which might give rise to variation in the phenomena of Asphyxia, which I had on a former occasion described. I began by investigating the effects of temperature in asphyxia from submersion; and in so doing I deferred the consideration of every other cause capable of affecting the life of animals in similar circumstances, to a future stage of the inquiry, when they should be successively examined.

In thus confining myself, at the outset, to the influence of temperature alone, I proved, that according to its degree, it occasioned considerable variation in the duration of life in the animals which I submitted to experiment. It was found, that when plunged under water, their existence was prolonged in proportion to the coldness of that fluid, and to the lowness of the temperature of the atmosphere for some time preceding the experiment.

These facts naturally led me to inquire what is the limit of this influence, and to ascertain the greatest duration of life which these animals can enjoy when deprived of the external air by submersion in water. Is the duration of asphyxia, in parallel cases, unlimited? Do frogs pass the winter under water, without coming to the surface during the whole of that season, to

breathe? Or are we to believe that they exist in this way during a much longer period still, viz. that which elapses from the time of their disappearance in autumn, to their return in spring?

Spallanzani was not of this opinion. From information furnished by the frog fishers in the vicinity of Pavia, he states, that these animals leave the water of the rivers of that country in October, and retire into moist sand, in which they contrive an opening called by the fishermen the *frog's vent hole* (*il respiro della rana*). These people brought some of this sand to Spallanzani; and, on its being properly moistened, he saw the frogs which he had put into it act precisely in the manner which had been described.

Notwithstanding this authority, however, some celebrated French naturalists report that frogs retreat into the water during the cold season, from the month of October to the beginning of spring. The testimony of one of these learned men is decisive on this point, as far as regards France. M. Bosc, who has observed with particular attention the habits of these animals in various climates, has himself known frogs to live under water during winter, and has frequently caught them in that season. But how do they live under water? Do they remain always at the bottom, or do they from time to time come to the surface to breathe? It is by no means easy, by the most attentive observation, to prove either. Allowing that we could stand on the banks, with our eyes constantly fixed upon the water, how are we to be assured that these animals have not escaped our observation in coming to breathe at the surface? And admitting that it was impossible for them to elude our vigilance, it would still be necessary to watch them during the whole of the time that they are incapable of living without breathing. In the preceding experiments we have seen that they have lived under water for the space of two days and a half. We have, therefore, as yet, no direct proof that these animals pass the whole of the winter under water without breathing.

It might be alleged in favour of this opinion, that living frogs have been found under ice; but facts of this kind, though they have undoubtedly been frequently observed, are not circumstantially enough detailed to serve as conclusive evidence. It would be necessary to know precisely the number of days from the formation of the ice, and to be satisfied that no aperture existed in it. M. Bosc has informed me that he has seen frogs towards the end of winter leave the water at noon, and remain a short time on land to breathe.

In the numerous experiments which I made during the winters of 1816 and 1817, on the asphyxia of frogs in a determinate quantity of water, I did not find that in any case their existence was extended beyond two days and a half, even in circumstances

the most favourable for its prolongation during their submersion. In one experiment by Spallanzani, a frog lived eight days under water, the temperature of which varied from half a degree to one degree above the freezing point; but he adds, that at a higher temperature, it would inevitably perish in the space of one day. But the temperature of the waters which frogs inhabit during the long season of their retirement, varies considerably; we are not, therefore, warranted to conclude, from the facts hitherto known, that frogs pass the autumn and winter under water, without coming occasionally to the surface for the purpose of respiration.

We cannot suppose that they possess this faculty from their being torpid during their hybernation, because torpidity does not dispense with the necessity of respiration. Besides, as M. Bosc has observed, frogs do not pass the winter in a state of torpidity, if by that term we mean the absence of sense and voluntary motion. They are certainly less active during cold, but they move even at the freezing point.

In the experiments which I have made on the influence of temperature, I obtained the same results; but in these experiments, the agency of the air contained in the water was not an object of investigation. The examination of this question would perhaps make us acquainted with a new condition capable of influencing the duration of the life of frogs under water, and might probably lead to the solution of the question which we have just been discussing. Experiments alone can decide it; and I know only one which has been made on the subject. Spallanzani placed a frog in water, deprived of its air by ebullition, and another in an equal quantity of aerated water. The frog which was placed in the water deprived of its air exhibited signs of approaching death at the end of ten hours, whereas that in the water containing its air was not reduced to the same state till the expiration of twenty hours. But this experiment, unsupported by any other, proves nothing; for the result might arise entirely from difference in the strength of the two animals, every other circumstance being the same.

The influence which the air contained in the water exerts on the life of fishes, has been examined with very great care by Spallanzani, by M. Silvester, and by MM. Humboldt and Provençal. The labours of these different individuals have brought to light some facts highly interesting to the natural history of fishes. But the results of their investigations are not strictly applicable to a different class of animals. Fishes are provided with gills, a respiratory apparatus, by means of which the blood of these animals, destined to live constantly in water, is exposed to the action of the air. Frogs which have attained their adult state, as well as toads and salamanders, are

only furnished with lungs, organs designed merely to respire the atmospheric air, whether they inhabit the water, or live on land.

But the faculty of existing in both elements does not constitute these animals *amphibious*, in the sense now attached by naturalists to that term. To be amphibious, they must possess the double faculty of respiring the air of the atmosphere, and living at the expense of the air contained in the water. But this double means of existence has not been recognised in any species of vertebral animals arrived at maturity, except the *Protei* and *Sirens*. M. Cuvier has demonstrated that they possess the same structure that the tadpoles of salamanders possess—lungs and gills in the same individual, which enables it to carry on this double function.

If the batracians, and these singular animals which have been added to that family, enjoy the rare privilege of breathing the air of the water, as well as that of the atmosphere, they are also provided with a double apparatus of gills and lungs which characterizes that double faculty. There is nothing as yet, however, which can lead us to presume that the batracians which are not supplied with these two sorts of organs, enjoy the advantage which would result from their possession.

What influence the air contained in water exerts upon the life of these animals, is therefore a question both new and interesting; and one which I have endeavoured to solve by experiment.

I made use of water which I had exhausted of its air by ebullition. We know from the experiments of MM. Humboldt and Provençal, that the air is not entirely expelled from water by boiling it in an open vessel; but the quantity which remains after this procees is so inconsiderable, as we shall see by and bye, that it is scarcely appreciable.

I employed glasses of the capacity of 80 centilitres, which I filled with boiled water, reduced to the temperature of the atmosphere, and inverted over saucers containing two centilitres of the same water. I then filled an equal number of similar glasses with water containing its air, and placed them in saucers of the same kind. I had previously introduced a frog into each glass at the same moment, in order to observe the duration of their existence in these two different conditions.

The frogs which had been immersed in the water that had not been deprived of its air, for the most part, lived longer than those in the non-aerated water; but the difference was seldom sufficiently striking or uniform to render the result decisive. The only inference which can be drawn from this series of experiments is, that the smallness of the quantity of water employed did not contain enough of air to produce marked and

uniform differences. It is of course still more unlikely that the presence of the particles of air which might remain after ebullition in open vessels, can have any sensible influence on the life of frogs, though it has been observed by Humboldt and Provençal to have a very manifest effect on the life of fishes. For this reason I have not had recourse to the process employed by them to expel from the water entirely the particles of air which remain after the ordinary process.

Though the preceding experiments failed in exhibiting any very striking or decisive results, they at least served to lead me to undertake others in which the quantity of water was larger, in order to augment the quantity of air.

On the 10th of November, 1817, the temperature of the atmosphere being 51°, and that of the water 55°, I filled six glasses similar to those employed in the former experiments, with aerated water, and inverted them over the holes in the shelf of a pneumatic trough, containing 56 centilitres of water from the Seine. Under each of them I had placed a frog, and I put an equal number under glasses of the same dimensions, containing water which had been boiled, and cooled down to the temperature of the water of the trough. These I placed in saucers. The frogs which were in the water deprived of its air lived from three hours forty minutes to five hours 30 minutes. Those in the aerated water lived from six hours 43 minutes, to ten hours 40 minutes—being double the term of existence in the other case.

Having found, in these twelve experiments, that every one of the frogs which had been put in aerated water survived all those which had been placed in water deprived of its air, I think we are justified in regarding such striking and uniform differences as sufficiently decisive of the superiority of aerated water over water from which the air has been expelled, in maintaining the life of these animals. It does not, however, follow, that their existence may be thus indefinitely prolonged.

Though it did not appear at all probable that frogs, unprovided with organs for the specific purpose of acting upon the air of water, were capable of existing in it like fishes; and although Spallanzani had failed in his attempts to decide this point, I considered it incumbent upon me to neglect no means which might determine how far the presence of air in water influences the existence of frogs in that element. With this view I made the following experiments:

On the 4th of December, the air of the apartment being at 42°, and communicating freely with the external air by means of a window which was kept always open, I filled a cylindrical glass vessel, of the capacity of 12 litres, with water from Arcueil, into which I put a male frog (R. Temporania). To prevent it

from coming to the surface to breathe, I employed a partition of iron wire, which I placed in the water. I left the apparatus in this state till the next day, when I found, as I had reason to expect from my former experiments, the frog alive. By means of a syphon which passed through one of the meshes of the net-work partition, I withdrew the water, leaving a small portion sufficient to keep the animal always in a state of submersion. I then filled the vessel immediately with fresh water, and continued renewing it in this manner every day. Not only did the frog live beyond the greatest term which I had obtained in my former experiments, and beyond the eight days during which, in the experiment of Spallanzani, a frog lived under water where the temperature was one degree, or half a degree above the freezing point, but it lived thus situated during the month of December, the whole of January, and to the 25th of February, being more than two months and a half. When it died, we had forgotten to renew the water, which till then had been regularly changed every day.

The temperature, during the whole of this experiment, had varied from 32° to 51°. The water was at this latter point when the animal died. During this long interval it never appeared to be deprived of sense or motion, not even when the temperature was at 32°;—an additional proof of what I observed on a former occasion, that frogs do not become torpid under water at the point of congelation.

Here, then, is a decisive experiment, which proves that a frog may exist for months under water, without ever coming to the surface to breathe, provided that liquid is in sufficient quantity and regularly renewed. It lives at the expense of the air which it finds in it; for if we neglect to change the water, or if we employ water from which the air has been expelled, death is the certain and speedy consequence. One of the most remarkable results of this experiment is, that frogs are truly amphibious animals, since they live on land by respiring the atmospheric air, and are capable of living under water by means of the air contained in that fluid, without being obliged to rise to the surface to be supplied with it from the atmosphere. But in this respect frogs are much more remarkable than tadpoles, for although these young animals possess the double faculty of living by means of the air of the atmosphere and that which is contained in water, they cannot exist on land before the complete development of their organs; so that, notwithstanding their double respiratory apparatus, they cannot be considered as amphibious, seeing that they are incapable of inhabiting both land and water.

But what renders this faculty still more extraordinary in this case, is, that it is enjoyed by frogs though they are not fur-

nished with the double apparatus of lungs and gills. Their only organ of respiration with which we are acquainted is the pulmonary system. It would, therefore, be interesting to ascertain by what means the air of the water exercises its vivifying influence on the economy of the animal when plunged under water.

I may observe before proceeding farther, that it is possible for these animals to make the water enter into their lungs, and that these organs perform the office of gills, and thus act upon the air of the water. This point may be determined by observing them under water in a transparent vessel. We know that, from their want of ribs, the mechanism of their respiration differs from ours. To supply this deficiency, they swallow the air, and make it pass into the lungs in such a manner, that their inspirations are rendered evident by the movements of the throat in the action of deglutition. I therefore paid particular attention to this circumstance in frogs, when immersed under water. If we count the movements of the throat in the air, we shall find that a frog makes from 40 to 100 inspirations in a minute. The moment we plunge it into water these movements cease; and, however long the animal remains in this situation, these movements will not be renewed, except in very rare cases indeed. During the whole period of two months and a half the experiment lasted in which the frog lived under water, I never observed a single action of deglutition. And, admitting that the animal did sometimes breathe when it was not in my power to observe it, what influence could a few inspirations have had, in such a long period, on the life of an animal which, in the air, inspires so frequently?

An interesting experiment of M. Humboldt is analogous to the one which I have just related, and confirms its results. Having counted the number of inspirations performed by a frog in a given quantity of atmospheric air, he introduced into it a measure of azote, and immediately perceived the number of inspirations diminish, and on every successive addition of azote they uniformly decreased. But neither azote, nor hydrogen, nor carbonic acid, are so powerful as water in arresting the inspiration. I have had an opportunity of satisfying myself on this point by experiment; and in some hundreds of experiments which I made on the asphyxia of frogs in water, I have in very few cases been able to discover any movements of deglutition, nor has Spallanzani, in his numerous researches on frogs, observed any.

These experiments might be regarded as sufficient to show that it is not by means of the lungs that these animals receive the influence of the air in water, but the fact is too important

not to be submitted to a more rigorous examination. It was on this account that I instituted the following experiments.

If frogs live under water by inspiring that liquid, should we not find some of it in their lungs? After having waited until they no longer exhibited any signs of life on being pinched, I have withdrawn them from the water, and though I have examined their lungs with great care, I never could detect any water in them. I have repeatedly made this experiment with the same result, and Spallanzani, who opened a great number of frogs that had been asphyxiated, never found any water in their lungs. It might here be objected, that the animals died in the act of expiration, and hence the reason that no water was found in their lungs after death. To remove this objection I placed ten frogs under glasses inverted in a trough containing 56 litres of water, and opened them at different periods of their existence under the water, but never could detect any of that liquid in their lungs.

In expiration frogs compress their sides. Now, if a few expirations are sufficient to empty their lungs, it might be supposed that, when we take a frog out of the water for the purpose of examination, it will have had time to expel the water from its lungs before they could have been exposed to view. The following observations, however, prove the contrary:—When we put a frog into a vessel of water inverted in a trough, we presently observe bubbles of air escaping from its chest; these bubbles continue to appear at different intervals, and frequently an hour elapses before the lungs are completely exhausted of air. Again, when we suddenly open the sides of a frog in the atmospheric air, taking care not to wound the lungs, we do not always find air in them. In this case, perhaps, the pain and terror which the animal suffers, and the exertions it makes, are sufficient to expel the air in so short a time.

Thus it would appear that the air contained in water does not act upon frogs which inhabit it, through the medium of the lungs. It is to the skin therefore that we are to refer the action of the air, for this is the only organ which is in contact with the water.

What then is the nature of this action on the skin? Is it the same as what takes place in the gills of fishes? This question I shall examine on another occasion. For the present, every thing which concerns the changes which the organs effect in the air, is foreign to my undertaking, When I shall have terminated what regards asphyxia, I shall then enter on the examination of the other questions which present themselves in the course of the inquiry. I shall here therefore confine myself to the facts which I have just established, that frogs can live for months under water by means of the air which they meet

with there, and that the skin is the organ which receives the influence of that fluid. I shall merely add, that while they live in water which is daily renewed, we observe the vessels of the web of their feet filled with red blood.

In the preceding experiments the water surrounding the frog was in a state of rest. Are these animals capable of existing submersed in running water? This question might appear unnecessary if Spallanzani had not concluded, from his experiments, that they died sooner under running water than in the still water of his vessels. I have endeavoured to decide this question in the following manner.

On the 6th of November, I put a frog into a net, from which I suspended a weight, and having lowered it into the Seine in a place where there were ten feet of water, I fastened it to a fixed boat. On the 11th I drew up the net, and found my frog alive and well. I returned it into the water, and on withdrawing it on the 17th, I found it as lively as before. When this experiment was going on, frogs which were in vessels containing a decilitre* of water which was not changed, lived only a few hours.

It appeared probable that the aquatic salamanders, as well as frogs, were endued with the power of living under water at the expense of the air which it held. This I determined by experiment, and found that the same was the case with the toad, though it is naturally a terrestrial animal.

Having determined that this faculty belonged to the three genera of batracians which I submitted to experiment, it became important to investigate the conditions capable of influencing them in this respect. It therefore was necessary to ascertain whether these animals enjoy the same advantage in all seasons, and how far they are affected by temperature.

It would seem that at the period when frogs leave their retreat, about the beginning of spring, they are no longer in a condition to exist under water. At this time a remarkable revolution takes place in these animals. They are in a state of the highest excitement, and particular parts of their body undergo evident changes. The paunch of the male swells and grows livid in a most singular manner. This change announces the epoch of their loves. I wished to ascertain if at that season they lose or retain the power of existing under water.

On the 7th of March, 1816, the water being at 46°, I fixed a frog by the foot to the bottom of an earthen vessel containing twenty-eight litres† of water from Arcueil, taking care, as in the preceding experiments, to change the water daily. It lived in

* A decilitre is equal to one-tenth of an English quart.

† A litre is equal to an English quart.

this situation twenty days. The temperature of the water, during the whole of the time, never exceeded 50°.

Frogs therefore are capable of living under water which is regularly changed, a considerable time after the period of their appearance in spring. I have also determined by experiment that they enjoy the same faculty in autumn, at the period when they usually disappear. But are we to consider this sort of existence as unlimited during these seasons, or during the whole year? Are we to regard any other influence besides that of the *quantity* of aerated water, or does *temperature*, which we have seen to exert such powerful influence on reptiles immersed in determinate quantities of water, produce any effect upon them when the quantity of water is indefinite?

We have seen that in experiments made in the spring of 1816, a frog died the twentieth day after living under water which had been regularly renewed, the temperature of which scarcely ever exceeded 50°. In autumn, in the month of October (1817) a frog lived eleven days under water in the glass vessel already described; during that time the temperature fluctuated between 46° and 53°, and it was when the water was at 53° that the animal died. These experiments led me to perform others, to ascertain if an equally low temperature could influence the existence of these animals under water containing air, and properly renewed. On the 12th of April, the water being at 53°, I put a frog into a tub containing fifty-six litres of water from the Seine, and kept it at the bottom by means of a thread, with a weight appended to it. Next day I found it dead. I repeated this experiment several days following, with the same result; the temperature was raised during the experiment to 57°.

Thus frogs readily live in vessels containing twelve litres of water without ever coming to the surface, provided the water is changed every day, and its temperature is preserved between the freezing point and 50°. At this point, however, they can hardly exist; and if the heat is raised to 53° or 57°, they soon perish. These effects of temperature, correspond with those which are related in the first Memoir, and are perhaps still more striking.

In the experiments which we have just related, the animals were kept in water which was renewed every twenty-four hours. But do the same deleterious effects result from such a slight augmentation of temperature, when they are kept under water in rivers or ditches? When they are not restrained, there is nothing to prevent their coming to the surface when the temperature of the water reaches that point. Were the animals therefore confined in such a manner as to prevent them from coming to the surface to breathe, would they yield to the same temperature which proved so fatal to them in the vessels in

which I submitted them to experiment? At first view both cases appear to be the same; for in both, the quantity of water is unlimited, seeing that that in the vessels is changed. But the renewal of the water once a day may not be sufficient for the animal, when we consider that in a river it is continually changing. As such a difference in the circumstances might influence the result, I wished to satisfy myself on the subject by experiment.

On the 12th of April, I put seven frogs and two toads into a wicker basket, and lowered them into the Seine. The temperature of the water at the surface was 53°, at which point, it will be recollected, frogs could not live when confined in fifty-six litres of water which was renewed every twenty-four hours. On the 20th of the month I withdrew them, and out of seven frogs, four were dead; the other three, with the toads, were still alive. The temperature was then at 55°.

There was therefore a decided difference in the results obtained in the river, and those which took place in the vessels, the running water at 53° proving much more favourable to the life of frogs. This difference is not attributable to a difference of temperature at the surface and at the bottom, for in several experiments in which water inclosed in a bottle was sunk to the depth of the basket, its temperature was uniformly found to correspond with that of the surface.

Of the two toads which I had put into the basket, one was found dead on the 5th of May, and the other on the 19th of that month, the water being at 62°. On the 13th of June one still survived of the seven frogs which had been put into the water on the 12th of April. In that interval of upwards of two months, the temperature varied from 53° to 71°. More than the half of them died during the first eight days, when the temperature was between 53° and 57°, one only having held out till the heat reached 71°.

In comparing our experiments in vessels, with those which took place in the river, we see that the latter situation is the most favourable to the existence of the batracian reptiles. Yet in these two cases the same water was employed, and the temperature was the same. The only appreciable difference which we can point out, is the continual renewal of the water in the running stream.

There are three conditions therefore which powerfully influence the existence of frogs when living under water. 1. The presence of air in the water. 2. The renewal of that liquid; and 3. Its temperature.

The relative influence which these several circumstances exert, merits particular attention. The first of them we have examined with great care, and have established its power of

prolonging the existence of frogs when confined in water. But in what way does temperature act in this case? Considering that the air is the principal agent in prolonging the existence of these animals under water, it might be supposed that the augmentation of temperature operated by diminishing the quantity of that fluid. But the temperature which proves fatal to frogs residing under water does not in fact alter the proportions of air which it holds. From the labours of Humboldt and Provençal on the respiration of fishes, we learn that the water of the Seine, in the different analyses performed by them in the months of September and February, contained the same sensible quantities of air. I have myself observed the temperature of the Seine to vary from the freezing point to 60° and 62°, a temperature superior to that which proved fatal to the greater part of the frogs which had been submersed in that river.

As the quantity of the air then remains the same, and as the temperature alone alters, it is to that cause that we must attribute the difference in the results.

The experiments related in my last Memoir agree in every respect with the facts which I have now announced. I proved that the existence of frogs under a determinate quantity of water is abridged in proportion as the temperature is augmented from 32° to 107°, the point at which they speedily perish; and that through the whole extent of this scale, the variation of a very few degrees is capable of producing a considerable difference in the term of their existence. I have now shown that the air contained in water has a contrary effect to that which an ascending temperature exerts; that it tends to prolong the existence of these animals, and that the term of their existence increases with the quantity of aerated water under which they are confined.

In a limited quantity of water, which is renewed once a-day, and the temperature of which is kept between 32° and 50°, the heat is not high enough to counterbalance the vivifying action of the air, but when it amounts to 50° or 53°, the deleterious influence of the elevated temperature overpowers the salutary agency of the air, and the animal dies, if the quantity of the air is not increased. We may augment the quantity of the air by supplying a larger volume of water in which it is present. It is on this account that frogs under running water resist a temperature which, in vessels whose contents were only renewed once a-day would prove fatal to them. But as the quantity of air which water holds is small, the influence of the renewal of that liquid in counteracting the effects of an elevated temperature is very limited. There is only one means, therefore, by which these animals can resist it, viz. by coming to the surface

to breathe, without which, most of them would perish under water at the low temperature of 53° and 57°.

These experiments exhibit some important relations between the quantities of air, and the degrees of temperature. We have seen that these two circumstances exert an inverse action, and that we can, within certain limits, balance the effects of the one by means of the other. The small quantity of air contained in water under the temperature of 50°, which is sufficient to sustain the life of these reptiles, at the same time effects a remarkable change in their mode of existence. Every one knows the extreme agility of frogs, and how opposite they are in this respect to toads; but their residence under water does away with this difference, which alone might serve to distinguish them. It does more, it makes them so slow in their motions, that they become more sluggish than turtles. The slightest noise, which, while they breathed the atmosphere, used to strike them with terror, no longer makes any impression upon them. The light, which on other occasions so readily brought them to the surface, has now lost its wonted power. Nevertheless, at a low temperature they enjoy sense and voluntary motion, while to air and temperature they show extreme sensibility. Their residence under water, in short by withdrawing them from the atmosphere, so completely changes the manners of these animals, that, but for their form, they would be supposed to belong to another species.

Fom the experiments detailed in this Memoir, it follows:

That the air contained in water prolongs the life of the batracian reptiles when submersed in that liquid.

That within certain limits their existence is extended in proportion as the quantity of water employed is great; that in ten litres of aerated water which is renewed once in the twenty-four hours, frogs can exist several months, if the temperature is kept within 32° and 50°; that in this case when the temperature is raised to 53° and 57° they die in the space of one or two days; that a very small number in a similar situation can resist a heat of 69°.

That frogs do not respire the air of the water by the lungs, but that it supports the life of these animals by acting upon the skin.

That the action of the air and that of temperature produce opposite effects upon these reptiles when confined under water.

That between 32° and 50° the presence of air in sufficient quantity in water, counteracts the deleterious influence of an elevated temperature, but that at 53° the influence of temperature counteracts the vivifying action of the air contained in water.

That in general these animals, to enable them to live in water of a temperature above 50°, are obliged to come from time to time to the surface, to breathe the atmospheric air.

Researches on a Disease, hitherto little known, which has received the Name of Softening of the Brain. By L. ROSTAN, M. D.

(From the London Medical Repository.)

CHAPTER SECOND.*—*Description of the Disease in its simple but irregular State.*

But the affection upon which I am treating does not always proceed with this regularity. Even in its state of simplicity—that is, when its progress is unfettered by a concomitant disease—it presents singular anomalies, with which it is very essential to be acquainted. These anomalies throw much uncertainty on the diagnosis of the disease, and may even render it utterly impracticable—not from any defect of observation, but from the nature of the symptoms which the patient presents. Although there exist a number of latent and very obscure diseases, it does not follow that they have been ill observed. The very knowledge of such exceptions constitutes, on the contrary, a proof of more advanced observation. And why should that which occurs in gastritis and the other phlegmasiæ, not occur in cerebral softening? The disease may then exist in a latent form. There are some cases which present no symptom of it; others where the symptoms are utterly contrary to the regular disease; and others, again, where their number is insufficient to characterize it. Under some circumstances, the precursory symptoms are wholly wanting: such are the two cases which I am about to record. Yet I think these instances much more rare than persons little acquainted with cerebral softening may suppose. Such persons scarcely think of inquiring into the history of a case. Struck with the apoplectic state, they do not closely interrogate the patient, while yet capable of replying, on his previous condition. After admission into an hospital, the information which may be obtained from relatives is commonly excluded. It also frequently happens that the patient, although apparently retaining unimpaired intellect, has lost all recollection of his previous state; and it is only from the report of attendants that valuable information can be acquired. These and other causes, which I may not have observed, sufficiently explain the absence of the precursory phenomena in some instances. They, however, may not exist, as will be seen in the following cases.

EIGHTH CASE.—*Cerebral Softening without Precursory Phenomena.*—A woman, aged forty-one, remarkable for her great strength and activity, had been for some years blind, but had

* Continued from last Number, page 403.

never suffered any paralytic seizure. On July 30, 1820, without any premonitory symptom, she suddenly fell down, deprived of sense and motion, and was carried to the infirmary.—*Symptoms.* Reclination on the back; head fixed for a moment, then turned to the right or left; arms raised in all directions with a sort of agitation; left hand incessantly fixed on the forehead; the right very moveable, never passing the level of the skin. On being touched or pinched, she raised herself with an expression of anger; and when questioned, seemed to listen, and remained motionless, as in ecstasy, without attempting to articulate any reply. It was impossible to discern whether the queries were comprehended. The skin was warm; pulse strong and very frequent; respiration, action of the heart, and sound of the thorax, natural; jaws constricted, but still separable; tongue red and dry; evacuations natural. Blister to the nucha, fifteen leeches to the anus, purgative injections prescribed; but their administration prevented by the violent agitation of the patient.

31st.—More calm; complete imbecility. Remedies of yesterday applied, with the addition of cream of tartar.

August 1st.—The mouth completely drawn to the left; motions of the right arm and leg considerably diminished. On pinching the paralysed arm, pain was, after a time, felt. Patient tried to articulate some phrases, and directed the left arm to the forehead.

2d.—All these symptoms more decided; deglutition impracticable.

3d.—Left side utterly motionless.

4th.—Tongue parched; prostration; eyes wide open, fixed; features shrunk; mouth closed; respiration hurried; snoring; hand directed to the forehead; carphologia at rare intervals. Died during the night.

Dissection.—Exterior natural. Parietes of the heart thickened; its cavities, particularly the left, dilated; stomach and duodenum uninflamed, latter containing much unhealthy bile; iliac portion of the small intestine corresponding to the uterus inflamed to the extent of a foot, nearly disorganized, and filled with a deep red mucus; liver gorged with livid blood, and apparently softened. The dura mater was thin and transparent; other membranes loaded. The brain on being sliced showed here and there rose-coloured or yellowish circles; both anterior lobes anteriorly softened and adherent. All the neighbouring part of the right hemisphere exhibited the same alteration, especially near its lower point, where the organ was pulpy, and, as it were, purulent. Corresponding corpus striatum softened, and between it and the optic thalamus a yellow spot, indicating by its radiated appearance the existence of a cicatrix. Little

serum in the ventricles. Optic nerves and other portion of the encephalon natural.

Ninth Case.—A woman, aged sixty-nine, was admitted into the infirmary, May 21, 1820, for a slight catarrhal affection. On the morning of June 12 she became suddenly senseless; and presented, half an hour afterwards, complete loss of consciousness, motion, and sensibility, particularly of the left side; pale countenance; slight contortion of the mouth to the right; contracted pupils; frequent and difficult respiration; pulse hard, frequent, regular. Twelve leeches to the neck; purgative injections. Symptoms for ten days unaltered.

13th.—Leeches reapplied; purgative injections. Following days, blisters to the nucha; sinapisms to the feet.

23d.—Pulse less frequent and strong; respiration again natural; paralysis of the left side complete; general insensibility of the skin, particularly on the left side. Tongue inclined to the right; pupils contracted. Intellectual faculties daily recovering. The patient recognised her attendants, and seemed to comprehend the questions put to her. She even answered two or three words, but the rest was unintelligible. She voided fæces, when placed on the pan. Integuments of the coccyx slightly excoriated.

27th.—Tongue dry and blackish; bowels costive. Cinchona and rhubarb.

July 8th.—Tongue very black and dry; left pupil dilated. Diarrhœa for five or six days; afterwards progressive weakness, and increasing difficulty of articulation. Mouth and tongue sooty; diarrhœa continuing; pulse small; respiration natural. Death on the 18th.

Dissection, on the 20th.—General emaciation; skin yellow and earthy; left pupil dilated: interior of the mouth covered with a sooty layer. The membranes of the brain were very pale, and the organ presented a softening of the whole middle lobe of the right hemisphere. It seemed to consist of a pulp, which grew softer as it approached the centre; so that it might have been regarded as a pulpy effusion, if the parietes had been more solid. This softening was limited internally by the unaltered paries of the right ventricle; externally, it extended to the cortical substance. The ventricles contained very little serum; that of the right was turbid and slightly flocculent. The rest of the brain, although soft, was healthy. Right lung adherent; in its middle lobe an encysted tubercle, of the volume of a small nut; its superior part and posterior border presenting a peculiar alteration. Left lung, posteriorly gorged, contained some tubercles towards its root. Heart very small, pale, and lacerable. Liver yellow and flaccid. Gall-bladder much distended with bile. Other organs sound.

The affection which caused the death of this patient was not announced by precursory symptoms. When she had somewhat recovered consciousness, and was questioned respecting the seat of her pain, she directed her hand to the right side of the head; but, although seemingly comprehending the interrogatory as to any sense of pain in her limbs, repeatedly answered in the negative. These two cases, although destitute of precursory phenomena, and exhibiting some irregularities, still show a few signs capable of distinguishing the disease. Their progress particularly appears striking.

The succeeding history is remarkable, from the difficulty at first experienced in fixing the seat of the disease. The patient felt no particular pain. Her altered countenance alone indicated a formidable malady: and it was only on the commencement of impeded motion that the species of lesion could be accurately distinguished.

Tenth Case.—A widow, aged eighty-seven, of small stature and sanguineous temperament, was admitted into the infirmary June 3. She complained of general suffering, without particular pain. The most rigid examination threw no light on the diagnosis of this insidious, but obviously formidable affection. The face was flushed. Patient reclining on the back, and greatly agitated: limbs, especially the superior, in constant motion. Respiration short and sonorous; each expiration accompanied by a sigh: temperature of the expired air much elevated: thorax sounding well, except at its inferior and posterior parts. Pulse frequent, rather full; mouth dry and pasty; appetite gone; urgent thirst; skin warm and dry; eyes weeping; intellect unclouded. No abdominal pains; no fecal evacuations. Farther information precluded by the patient's deafness. Symptoms unchanged for three days, during which injections, stimulant pediluvia, and sinapisms, were employed. Patient complained of nothing particular, except a lumbar pain, doubtless consequent on accumulation of fæces in the colon.

8th. Hæmoptysis; left arm numbed; cheeks constantly flushed. Same treatment; blister to one thigh.

9th. Prostration; left arm still numbed; pulse slow; cessation of complaint; commonly drowsiness, but complaint renewed on being roused. Tongue dry and covered with a blackish fur. Respiration performed as though the patient was blowing on a heated body. On the following days, symptoms aggravated; prostration extreme; habitual drowsiness, with occasional agitation. Tongue dry, with thick black fur; thirst urgent; left arm gradually more numbed, and apparently very painful when touched; eyes tearful, and eyelids adherent; cheeks more than ever flushed: symptoms progressively increasing. Death on the 16th.

Dissection.—Much subcutaneous fat. Muscles red, and easily lacerable. Figure deformed.—*Thorax.* Right lung a little injected at its base; left *splenitized* and horn-like. Heart indurated; its cavities contracted and parietes thickened.—*Abdomen.* Stomach and small intestines partially red. Gall-bladder distended with blackish green bile.—*Cranium.* Dura mater almost universally and intimately adherent to the bones. A largish spot of blood between the pia mater and brain, and colouring both. Cortical substance, in several points, yellowish; the medullary natural. An ounce of serum in the ventricles. In the centre of the right hemisphere, nearly opposite the spot above mentioned, an old extravasation of the volume of an almond, and the surrounding parts softened and yellowish.*

The next case appears to me highly interesting, in consequence of the symptoms exhibited by the subject of it. In opposition to the preceding cases, this patient showed the commemorative signs without any positive symptom of paralysis. She even experienced general convulsions. The phenomena are perfectly in relation with the seat of the softening in the centre of the brain. I shall revert to this circumstance in the article on diagnosis.

Eleventh Case.—A stout, healthy, corpulent woman, aged seventy-two, of elevated figure and lively character, employed as cook till her sixtieth year, was admitted into the infirmary July 9th, 1817. A fortnight previously, she had experienced pains about the heart, and frequent faintings; thirst urgent; appetite gone; head very painful; mouth pasty; urine free; constipation: had kept her bed three days. Evening of the 9th, symptoms of gastric disorder.

10th.—Copious vomiting of green bile; a lumbricus voided by stool.

11th, at evening.—Reclination on the back; physiognomy much altered and dejected; eyes fixed on the top of the bed; vision occasionally disordered; tinnitus aurium, of old date; sense of smell obtuse. Mouth and pituitary membrane dry; taste impaired; deglutition difficult; respiration tight, and almost constantly moaning. No cough, expectoration, or abdominal pain, even on pressure. Pulse full, indolent, strong, and intermitting every third pulsation Drowsiness; occasional complaints; motion very diffcult; intellect slightly disordered. Chamomile, antispasmodics, emollient injections, prescribed.

12th.—Decubitus on the back; face flushed; eyes haggard; senses more deranged; agitation extreme; deglutition more diffi-

* This history might perhaps have been referred to the chapter on the complications of the disease; but the progress of the affection, at first obscure, and subsequently showing itself by the development of phenomena, although the preceding circumstances were unknown, induced me to place it here.

cult, and executed with noise. Respiration constantly tight and moaning: abdominal pressure painful. Pulse unchanged. General debility increased; arms hanging on the sides of the bed; power of motion gone. Delirium continuing; loins constantly painful. Cataplasm to the abdomen; sinapisms to the feet. Usual injection returned without effect. Sinapisms in the evening had produced no rubefaction.

13th.—Abdominal soreness and dyspnœa increased. Blister to the left leg.

14th.—Prostration augmented; tongue blackish at the base; urine involuntary.

15th.—Night very restless. Seven, A. M., tongue black at the root, with a thick, ropy, yellowish fur on the borders; deglutition very difficult; respiration tight, but less plaintive. Some thick expectoration, slightly streaked. Abdomen less sore. The senses, particularly that of vision, improved. Pulse still intermitting every third stroke. Camphor added to the prescription.

15th, evening.—Symptoms less severe.

16th.—Night agitated: reclination on the back nearly horizontal; mouth half open; tongue very dry, and brownish. Increased dysphagia: thorax and abdomen very painful on pressure; respiration tight; general convulsions at intervals. Pulse intermittent and irregular; subsultus tendinum; haggard eyes; tranquil delirium: injections have not operated. Castor and antispasmodics.

17th, evening.—Decubitus horizontal; mouth open, and, like the tongue, dry; stupor of the eyes. General convulsions in swallowing, and subsultus of the limbs; pulse intermittent, feeble; great agitation; speech and consciousness gone; urine involuntarily discharged for the last six days.

18th.—Night restless; delirium. Face violet-coloured; great depression; pulse slow, feeble, irregularly intermittent. Mouth open, drawn to the right. Death.

Dissection, on the 19th.—Little emaciation.—*Head.* Dura mater pale red internally in nearly the whole superior half; but the loaded capillaries not distinguishable. Exterior arachnoid rose-coloured, and spread over with largish vessels; much reddish serum between it and the pia mater; ventricles containing much of the same fluid, thick and turbid; septum lucidum destroyed, with the exception of a few fringes; and all the parietes of the cavities remarkably softened; the arachnoid, where it invests the posterior part of the right ventricle, showing evident traces of inflammation. The plexus choroides red and tumefied.—*Thorax.* Right lung slightly gorged at its posterior inferior part; corresponding pleura inflamed. Ventricles of the heart dilated; parietes of the left thickened; and

aortic orifice contracted by indurated valves.—*Abdomen.* Gastric mucous membrane in the state which it commonly presents in aneurism of the heart. The whole intestinal canal inflamed, particularly the duodenum.

Twelfth Case.—A widow, aged sixty-eight, of sanguineo-lymphatic temperament, and fifteen months insane, came into the infirmary March 6th, 1820. On the preceding day she had become insensible, and now presented supine reclination; perfect loss of consciousness and of the senses; paralysis of the right side; respiration deep and frequent; slight dry cough; strong, full, and frequent pulse; flushed face; hot and dry skin; involuntary discharge of fæces and urine; mouth scarcely distorted. Tongue could not be seen. Twenty leeches to the neck; sinapisms; diluents.

7th.—Flushing of the face and tension of pulse diminished. Three following days, pulse irregular, at times intermittent. Death on the morning of the 11th.

Dissection, on the 13th.—Superficial veins of the brain much loaded. At the anterior part of the right hemisphere, an ecchymosis, extending to the next convolution, and occupying only its surface, which was much softened. Several similar ecchymoses posteriorly on the same side. Density and colour of the substance of the brain unaltered. A little serum in the ventricles, particularly the right, and the right corpus striatum softened. Lungs adherent: heart large; hypersarcosis, with contraction of the left cavities. Ossifications at the aortic orifice.

The closest analogy exists between the progress of this disease and apoplexy; it would be difficult to distinguish them in the living subject. But the morbid alterations found after death are also very different from those commonly observed, and may belong as much to cerebral hæmorrhage as to softening.

The last case was noted at a time when the disease was yet unknown. One may perceive how incorrectly the symptoms are described. It is by no means demonstrated that this woman had not exhibited precursory signs. I insert the case here to show how important is a knowledge of the affection to an accurate description of its symptoms. Most of these reflections are applicable to the fourteenth case.

Thirteenth Case.—A woman, aged sixty-three, insane, and paralytic in the right leg, was, on the 30th of March, 1817, stricken with sudden apoplexy, followed by incomplete loss of the external senses, sensibility and motion. Derivatives and emetics were employed with evident mitigation of these symptoms next day; but the yellow and altered aspect of the countenance, headach, dry and brown tongue, frequent pulse, and dyspnœa, continued increasing till the 12th of April, when the

following state was observed:—countenance changed; cheeks and chin flushed; blackish ecchymosis of the left eye and surrounding integuments; constant delirium; sleeplessness, and efforts to get out of bed, which necessitated restraint. Tongue, teeth, and lips, dry and black; respiration frequent, inspiration deep; expiration quick, sonorous; pulse soft and frequent; stools natural.

13th.—Same.

18th.—Countenance decomposed; insensibility; general immobility; respiration very frequent, rattling, and performed with the action of smoking a pipe;* pulse gone. Considerable slough on the integuments of the sacrum. Death impending; occurred on the 19th.

Dissection.—Exterior. Ecchymosis on the right eye. Ephelides on the right shoulder.—*Head.* Arachnoid corresponding to the dura mater in some points internally very red, as if with extravasated blood; in others yellow red: a thickish adventitious membrane investing all this surface. Cerebral arachnoid sound. Brain soft and small. Ventricles containing serum; and their anterior extremities obliterated by adhesions inseparable without injury to the soft and pulpy cerebral structure. Particular softening of the corpora striata and optic thalami, extending as far as the tuber annulare. The medullary substance, in some points, brown and blackish, and much softened. Cerebellum slightly sharing this disorganization. Calamus scriptorius superiorly obliterated. Medulla oblongata sound.—*Thorax.* Lungs inflamed, hepatized; a little effused fluid.—*Abdomen.* Some parts of the small intestine slightly inflamed.

Fourteenth Case.—A woman, aged eighty-four, and generally healthy, went to bed quite well on the 29th of October, 1817, after having supped as usual. Next morning she was found with complete hemiplegia of the right side, and paralyzed tongue. From the hard pulse, stertorous respiration, habitual drowsiness, and apparent annihilation of the intellectual faculties, cerebral effusion was suspected. After some days the state of the patient seemed to improve; but ardent fever soon came on; all the symptoms were aggravated; and death occurred November 21st.

Dissection.—Brain soft, and ventricles filled with serum. In the inferior part of the posterior right lobe, decided softening, and a kind of cavity, with yellowish parietes, such as distinguish extravasation of some date. This case is incomplete, and probably inaccurately recorded.

These are, doubtless, a small number of the anomalies which

* "*La malade fume la pipe.*" The action thus expressed in French I have repeatedly witnessed in comatose affections; and my experience has taught me to regard it as an unfavourable, if not constantly fatal symptom.—P.

cerebral softening may exhibit. It is incumbent on me to describe such only as I have observed. Other varieties may present themselves to those who prosecute similar researches. It is impossible to outstrip experience, which can alone multiply such examples. With regard to diagnosis, it is satisfactory to know, that most of the irregularities just cited find their explanation in the seat or nature of the morbid change; and that, instead of destroying, they serve but to confirm the rules laid down. I am even convinced that we may, by rigid attention, explain the varieties of symptoms which diseases in general present by the varieties of alterations of organs; that nature never errs; that the imperfection of our senses and means of investigation alone prevents us from ascertaining the cause of these anomalies; and that our indolence finds it more convenient to admit a pathological irregularity, than to search for a satisfactory explanation of its supposed existence.

The anomalies of the preceding cases consist in their symptoms not having been those of regular softening, the morbid change being, at the same time, strongly marked. The succeeding case, on the contrary, exhibits all the (external) signs of softening, and yet the alteration was scarcely perceptible, and its existence may even be doubted.

Fifteenth Case.—A woman, aged seventy-eight, small, thin, feeble, long afflicted, and confined four months to bed, had never experienced an apoplectic seizure, although her limbs were very weak, painful, and incapable of supporting her.

September 1st, 1820.—Head very painful; motions of the left arm impaired; not raised to the forehead without much effort and trembling; weight and numbness of the corresponding thigh much greater than in the arm; tongue mobile; speech slow and impeded; pupils contractile; intellect clear; mind clouded by apprehension. Physiognomy bad; digestive functions languid; pulse feeble and slow.

2d.—Motions of the arm tolerably free; numbness and pain of the thigh very great, but nothing apparent externally; rapid emaciation.

10th.—No change in the arm or thigh; mind clear; weakness extreme. Right leg very painful. Patient died next day.

Dissection.—Cerebral membranes pale; whole mass of the brain soft, but by no means so decidedly as to resemble jelly. Some points of the organ more affected than others. Cerebellum deficient in firmness. Right lung gorged; commencing hepatization of the summit of the superior lobe. Several fungi on the gastric mucous membrane, which was whitish and lax. A yellow tenacious substance on several points of the small intestines; violet-coloured injections of their internal surface.

CHAPTER THIRD.—*Complications of the Disease.*

After having examined the disease in its simple and regular and simple and irregular states, I shall present it in its state of complication. The diseases which I have most frequently seen to coexist with cerebral softening, are: sanguineous apoplexy, doubtless the most common complication; meningeal inflammation, more rare;* and cancer and exostosis of the brain. I have no doubt that tubercles, acephalocysts, and other organic lesions, are likewise complicated with this affection; but such cases have never fallen under my observation. The various phlegmasiæ of the other organs may also exist in combination with softening of the encephalon. To describe in detail each of these complications, would be superfluous. I shall proceed to cite only some of the most common cases.

SIXTEENTH CASE.—*Softening with slight Extravasation.*—A woman, aged sixty-six, had all her life been subject to headach. Menstruation commenced at eighteen, and terminated at twenty-eight; when she suffered nearly two years from chronic peripneumony. For some days she had felt pain in the left ear; and, while rising on the 6th of October, became suddenly senseless. Head inclined on the right shoulder; complete paralysis of the left side; sonorous respiration; full and frequent pulse; profound coma.

7th.—Head bent backward; countenance pale and decomposed; pulse frequent, soft, irregular; respiration sonorous, deep, interrupted by long sighs; whitish tongue; fæces involuntary; partial and clammy sweats, particularly on the thorax; replies correct, but slow; recollection of preceding events gone; intellectual stupor; tongue, when protruded, evidently inclines to the paralyzed side. The patient, interrogated respecting the seat of the disease, directed her right hand slowly to the superior part of the right side of the head, and complained of violent pain there. On the approach of a candle, the left pupil contracted; the right was immoveable.

10th.—Countenance more natural and calm; pulse slow, slightly irregular; respiration natural; thick mucus expectorated; tongue yellowish at its base; stools no longer involuntary; intellectual functions sound; recollection restored; motion of the left arm recovered, but pain in the shoulder. Pain in the head continues.

14th.—Better; tranquil sleep; left arm moveable; thigh paralyzed and insensible; violent pains in both limbs. Incipient fretting of the integuments of the coccyx.

16th.—Face somewhat altered; pulse high; appetite gone;

* As is seen in the thirteenth case.

severe pains in the left leg; movements of the arm free. Depression; wound of the coccyx enlarging.

20th.—Pains of the head and left side more violent; severe prickling for some minutes in the left leg. Moral depression increased. Ideas and presentiments gloomy.

28th.—Face more altered; pains very violent in the left limbs, but diminished in the head; tetanic stiffness of the left leg; arm moveable; stools involuntary; replies correct; sacral excoriation large and offensive.

30th.—Articulation of sounds difficult.

November 5th.—Pain in both legs; left constantly stiff; sacral slough enlarging.

10th.—Face decomposed and thrown back; eyes watery, and insensible to strong light; pulse frequent, weak, irregular; stools involuntary; delirium, with piercing cries, for an hour during the night; answers correct; no more pain in the thigh.

14th.—Transient delirium; pulse small, contracted, soft; acute pains in the summit of the head; recollection of past events again wholly lost; involuntary stools; slough large and fetid.

16th.—Almost utter abolition of intellectual faculties; tongue dry, brownish; breath fetid; skin dry and earthy; both arms mobile; left leg inflexible; rattling in the throat. Death.

Dissection.—General emaciation; sacral slough large, blackish, offensive.—*Head.* All the membranes injected; right cerebral hemisphere, in its posterior, superior, and internal part, yellowish, and flaccid for about an inch; beneath it, a sanguineous extravasation, about eight lines in diameter, and six deep, and of a blackish brown colour; no membrane of its cavity discoverable; rest of the brain firm and vascular. In the interior of the cerebellum, at its posterior inferior part, a cicatrix of a brownish and yellow colour; its centre resisting the scalpel, and enclosed in a very apparent membrane.—*Thorax.* Right lung inferiorly hepatized; heart large; left ventricle thickened; aortic orifice contracted; stomach contracted in its centre, internally rose-coloured; small intestines inflamed.

Seventeenth Case.—*Softening of a Portion of the Brain, with Extravasation.*—A woman, aged forty-four, of bilious temperament, was admitted into the infirmary with total speechlessness, preceded by sudden insensibility. No positive information on her present or anterior state, except that she had complained of pain in the side, and general uneasiness, some days before the invasion of the cerebral disease; that she had felt very much hurt at being placed in la Salpêtrière; had never suffered paralysis; and had fallen suddenly senseless while occupied in dressing her hair.

December 4, 1819.—Features altered; complexion yellow-

ish; right facial muscles relaxed; left contracted; mouth closed, and drawn to the right; jaws stiff; pupils contracting; skin warm; reclination on the back; speech gone; loss of motion; and stiffness of the right limbs; their sensibility unimpaired; dyspnœa; dry cough; weak, frequent, regular pulse; no appetite; deglutition impracticable; abdomen hard, tense and evidently sore on pressure; constipation; urine involuntary; drowsiness. Stimulant injection, sinapisms to the feet, blister to the head, prescribed.

6th.—Same state. Injection again.

7th.—Same, except that the mouth is open; tongue covered with a brownish fur; understands what is said. Acetate of ammonia.

Four succeeding days the same; face flushed.

12th.—Countenance cadaverous; eyes dim, half open; head thrown back; sense of hearing utterly gone. Death.

Dissection, thirty-six hours after.—*Exterior.* Colour yellowish.—*Head.* Membranes natural. Cerebral substance, for about an inch in the centre of the left middle lobe, softened and slightly yellowish. A kind of sanguineous extravasation in the centre of this softening, (in the corpus striatum,) by which a reddish tinge has been given to the yellow substance. An old brownish extravasation enclosed in a cyst, with parietes readily separable, in the centre of the right posterior lobe. Cerebellum a little softened. Spine not examined.—*Thorax.* Lungs posteriorly hepatized; an old cicatrix in their summit; many adhesions. Heart very large; its parietes thickened.—*Abdomen.* Considerable enlargement of the liver; its structure gorged. Internal, gastric, and intestinal membranes red.

Eighteenth Case.—*Sanguineous Extravasation with Softening of a Portion of the Brain.*—A stout woman, of sanguine temperament, aged sixty-six, was received into the infirmary May 10th, 1820, with severe pains in the loins and inferior extremities. She had never suffered from syncope, apoplexy, or other severe disease.

21st.—In going to the night-chair, she suddenly lost the use of her left limbs, without precursory sign or loss of consciousness. She fell; and on being carried to bed exhibited the following phenomena: cheeks flushed; features altered; skin warm; left limbs immoveable, but retaining their sensibility; reclination on the back; respiration free; cough severe; tongue moist; mouth not bitter; appetite good; neither abdominal pain nor headach; constant drowsiness. Antimonials, sinapisms, injections prescribed.

8th.—Depression; left limbs worse.

9th.—Reclination on the right side; head bent on the thorax;

eyes dim and weeping; skin cold; pulse small, irregular; total immobility of the left extremities.

10th.—Worse; sense of hearing apparently lost; the action of smoking performed by the lips. Insensibility. Death.

Dissection.—Exterior. Face coloured; trunk and extremities yellowish.—*Head.* Membranes healthy. Brain much loaded. A softening, of the size of a crown piece, in the middle and anterior part of the right anterior lobe; its colour deep red. A circumscribed extravasation occupying the left lobe to the centre of its optic thalamus, which had entirely lost its consistence. Ventricles distended by serum. Cerebellum sound. —*Thorax.* Lungs adherent and *splenetized.* Bronchial glands black and indurated. Heart developed; its parietes much thickened.—*Abdomen.* Gastric and duodenal mucous membrane smeared with mucus, and of a black and fungous appearance. Spine not examined.

Nineteenth Case.—*Consecutive Softening.*—A robust woman, aged seventy-seven, was admitted into the infirmary July 5th, 1820. Paralysis of the right side had, the preceding year, much impaired the facility of motion. For a month past she had been reserved; and complained of precordial anxiety, and dyspnœa, at times menacing suffocation. She now answered questions obscurely. Her intellect seemed dull. She complained of numbness of the right side. Blister to the nucha; cream of tartar. For some time the patient took her food, uttered no complaint, and ceased to attract attention; yet the paralysis increased; the whole of the right side wasted, and its extremities became œdematous.

September 4th.—Decubitus on the back; arms hanging by the sides; great heat on the skin: profound stupor; eyes dim and without expression; no sign of hearing. Countenance pale, livid, contracted; lower lip hanging down and tremulous; gums sooty; tongue black and dry. No abdominal pain; constant slight cough; great efforts of inspiration. Breath fetid, rattling; impending suffocation. Heart tremulous; small intermitting pulse; occasional efforts to rise.

5th.—Respiration tranquil; neither rattling nor complaint; small irregular pulse; involuntary stools. Death.

Dissection.—Membranes of the brain natural. Depression in the convolutions of the right hemisphere. Middle and superior part of the cortical layers of the left posterior lobe exhibiting an appearance of softening and disorganization; an old extravasation here extending to the vicinity of the middle ventricle. The posterior and most dependent part of the same lobe on the tentorium cerebelli, presented, in the convolutions, a similar alteration, traversed by some radiated bands. The right posterior lobe, in its most dependent point, showed its cortical sub-

stance in a state resembling mucus; about an inch farther the alteration seemed to diminish; an orange-pink tinge was there perceived. A small cavity in the right optic thalamus. Cerebellum soft. Whitish mucus in the small intestines; their membrane inflamed. Lungs adherent to the pleura and pericardium; and the thickened pericardium to the heart. This organ rugous, and presenting slips of adventitious membrane. Fatty state of the parietes of the right auricle, and dilatation of its cavity. Origin of the aorta ossified.

I cannot proceed without pausing on an important question, agitated by some authors, as to the relation which exists between cerebral softening and sanguineous extravasation—When both take place, which is the primary affection? Without entering into the opinions adopted by writers on this subject,* which would lead me too far, I shall merely state my own mode of thinking. I believe this softening to be, in most cases, a primary disease; and that this morbid change singularly favours sanguineous extravasation. It may, indeed, be conceived, that the vessels being less perfectly supported, will readily rupture, and thus produce extravasation; yet I do not think that softening invariably takes the precedence. Extravasation takes place without softening; but may also be thus induced. I shall presently state my own ideas of its formation, and the signs by which primary and consecutive softening may be distinguished from each other.

Twentieth Case.—*Cancer and Softening of the Brain.*—A woman, aged sixty-two, addicted to the abuse of spirituous liquors, had been repeatedly, for a short period, deranged in intellect. She sometimes complained of headach, and even raved occasionally; when, on January the 16th, she was seized with vertigo, delirium, and vomiting of aliment.

18th.—Countenance changed and yellowish; mouth drawn to the right; paralysis of the right limbs; pulse small and soft; respiration deep and moaning; tongue whitish; thirst; constipation. Intellect wholly deranged; and constant delirium, remarkable from the automatic repetition of all the words and phrases uttered around her. A sense of severe and lancinating pain referred to the front of the head; stools involuntary. Night restless; constant agitation; screaming; pupil sensible to light. These symptoms unchanged for twenty-four days.

Feb. 11th.—Face more altered; nocturnal agitation and screaming subsided; profound coma; plaintive respiration; involuntary stools.

18th.—Better; walked herself to the night-chair; left leg swollen.

* See the work of Rochoux, page 89. I am gratified in seeing that my own opinions frequently coincide with his.

25th.—Face earthy, decomposed; right limbs painful on motion; pulse frequent, wiry; respiration moaning; skin very hot; coma.

March 7th.—Left leg no longer swelled, but painful on motion; face yellowish; sweats cold, clammy, and partial; right side wholly paralyzed; pupils contractile to the last; respiration stertorous; pulse irregular, almost imperceptible. Death on the 8th.

Dissection.—Exterior. Skin yellowish; marasmus.—*Head.* Cranium thin; dura mater and arachnoid loaded.—*Brain.* Left hemisphere: convolution apparently obliterated externally about the middle superior part of its external surface. Whole hemisphere softened. A small, yellowish, granulated nucleus about the middle of the summit, just below the cortical substance. Anteriorly, in the corpus striatum, a cancerous tumour, of the volume of a nut, compressing the ventricle. Cerebral substance disorganized around; the surface of every incision presenting a glistening, and, as it were, varnished appearance. Right hemisphere injected towards its posterior part. A considerable cancerous tumour, surrounded by pulpy cerebral substance. Medullary structure less developed than on the opposite side. Cerebellum very large.—*Thorax.* Melanosis; tubercles of the right lung; scirrhous tumour at its superior posterior part. Some serum in the pericardium.—*Abdomen.* Intestines inflamed at intervals; uterus very small.

Twenty-First Case.—*Peripneumony and supposed Softening of the Brain.*—A woman, aged sixty-seven, first menstruating at seventeen, married at twenty, and a childless widow at forty, was admitted January 9, 1819, with a deep-seated pain in the left thoracic region, of three days' duration, aggravated by inspiration—not by touch. Infrequent dry cough; flushed cheeks; tongue white and moist at its base, red and dry at apex and borders; skin hot and rather dry; fever, with evening exacerbation; thirst; constipation: these symptoms consequent on suddenly suppressed diarrhœa. Leeches to the left side; mucilages; emollient injection.

It should be remarked, that the right arm of this woman was contracted and incapable of motion, but sensible to pain when pinched. This imperfection was limited to the arm. By the report of an acquaintance, it appeared that the loss of motion had been preceded by numbness and tingling in the hand, fore-arm, and subsequently the arm. The numbness gradually increased, and then disappeared; but the fore-arm remained slightly contracted on the arm, the latter on the trunk, and its functions were destroyed. The period at which the numbness commenced and subsided could not be precisely determined. I now return to the peripneumony.

30th.—Lips and tongue black; features altered; hard cough; bloody expectoration; pulse small, frequent, irregular.

31st.—Asthenic symptoms aggravated; expectoration suppressed; respiration stertorous. Death next day.

Dissection.—Nearly whole left lung hepatized; effusion of albuminous flocculi into the thoracic cavity; a little serum in the pericardium; abdomen healthy.—*Head.* Membranes sound; brain firm, and convolutions very strongly marked; cerebellum exhibiting a singular aspect; all its circumference transparent, and of an opal white colour. At the inferior part of the right lobe, near the tuber annulare, a very strongly marked depression, produced by an exostosis, which occupied the corresponding part of the petrous portion of the temporal bone, and the adjacent portion of the occipital. This osseous tumour, about four inches in circumference, was of a rounded form, and projected five or six lines. The depressed portion of the cerebellum very much softened.

It would be curious to know whether this woman had ever suffered from syphilitic disease; but the researches made on the body, and the information collected from her companions, afforded no proof of it.

Twenty-Second Case.—*Enteritis and Cerebral Softening.*—A woman, aged sixty-five, small, but stout, and of sanguine temperament, had for some time been in precarious health, and complained of severe abdominal pains and headach. Mild remedies failing, she had recourse to an empirical preparation, which induced violent hypercatharsis and extreme debility. On admission into the infirmary, her features were decomposed; tongue dry; thirst urgent; mouth bitter, with propensity to vomit.

The epigastrium and abdomen were intolerant of the slightest pressure; stools suspended; the skin was warm and dry; pulse frequent, not very full. There existed remarkable stupor, and very violent headach. Mucilages by the mouth and rectum, leeches, abstinence, and repose, were prescribed; but the symptoms were only aggravated in violence: and about the fifth day, without any complaint of the patient, in consequence of the delirium, which was also increasing, the right arm was observed to be a little violet-coloured, and very difficult of motion. On attempting to raise it, the patient screamed out. This state proceeded rapidly till death, which took place on the tenth day.

The convolutions of the left anterior lobe (of the brain) were found of a pink colour, and the corresponding corpus striatum reduced into a jelly. The intestines were in a state of general inflammation.

Chapter IV. *Duration of the Disease.*—Nothing is more difficult than to fix the duration of diseases. Their invasion

is frequently obscure, and termination imperceptible and ill-determined. One cannot precisely ascertain their commencement, or their close. The fatal issue of that under consideration, unfortunately leaves no doubt as to the period of its occurrence. It is not so with the invasion. Ought it to be dated from the moment at which paralysis strikes the patient with most violence; or should we refer it to that period at which the first attacks of the affection are manifested?* This distinction is highly important with regard to the diagnosis; the duration of the disease serving, in concurrence with the other phenomena peculiar to it, to distinguish it from numerous affections with which it might be confounded. However this be, we shall proceed to examine the duration of the precursory phenomena, and that of the disease when it has become strongly marked.

The duration of the precursory phenomena (first stage) varies from several days to months, and even years. This duration will be governed by the individual constitution; by the intensity and continuance of the cause; and the diseases previously experienced. If the person, attacked by cerebral softening, have been before stricken with apoplexy, and this have been imperfectly resolved, the precursory phenomena may continue several years. The same may be said of the insane, in whom these signs may manifest themselves early, and last very long. If an individual be under the influence of a violent moral affection, the precursory signs may offer only a very short duration, so as to induce the supposition that they have not been experienced. It may even happen that the patient, completely absorbed by his besetting sorrow, neglects to complain of headach or numbness of the limbs; and the symptoms of the disease thus elude the observation of his friends. Hence the difficulty of diagnosis is singularly aggravated.

When the disease is once developed,—from the moment of the paralytic seizure till death, a space of time may elapse, varying from two or three days to as many months. Its duration is, however, commonly that of acute diseases. Like peripneumony, it may terminate on the fourth, fifth, fifteenth and twentieth day. When it exceeds this term, the diagnosis is rendered more obscure. The disease may also pass on to the chronic state. Many circumstances, such as those above indicated, may influence its duration: the degree of action of the exciting causes; the constitution and health of the individual; but, especially, the extent, depth, and seat of the morbid change; and, lastly, the treatment. I have seen the softening occupy an entire lobe; and the patient destroyed in two days. When the lesion is superficial, it may go on very long. But this is not

* I incline to this opinion; although there is a commencement of alteration, from the moment at which the precursory signs show themselves.

the case when it extends to the medullary substance. A slight alteration in this substance will speedily cause death. We see that the duration of the disease may serve to fix the diagnosis, so as to enable us to distinguish whether the morbid change be superficial or deep-seated—limited or extensive.

Respecting the influence of treatment on the duration of the disease, I have nothing but conjectures to advance. This affection terminating fatally, it is difficult to decide whether the treatment have hurried on, or protracted, the issue. Doubtless, however, it may exert some influence on the duration. If the nature of the lesion be, for instance, inflammatory, blood-letting, and revulsions may retard its progress; but when the disease is of a contrary nature, they will only accelerate its march.

Chapter V. *Frequency of the Disease.*—Softening of the brain is by no means a rare affection. From my own observation, I believe it to be the most frequent of all the cerebral lesions. At *la Salpêtrière*, at least, it is more common than sanguineous apoplexy. If this be the case, why, it may be inquired, has the disease remained so long mistaken? The morbid change, we may reply, sometimes occupies so small a space that even those to whom it is pointed out cannot discriminate it; for this purpose much patience, attention, and observation of it in its most decided forms, is necessary; and frequently the natural colour of the part is not changed. If to this it be added, that the ventricles often contain much serum, the facility with which it may be mistaken for serous apoplexy will be at once obvious; and in those cases where no serum has been discovered, it is more convenient to give the appellation of nervous apoplexy, than incur trouble in searching for an alteration of this kind. I can only assert, that since my acquaintance with this lesion, I have never once met with serous or nervous apoplexy. I have, however, recently seen a woman, who presented all the signs of cerebral disease, and in whose brain no alteration was discovered. But the inspection of the spinal canal could not be accomplished: hence the case is utterly undecisive.

Chapter VI. *Morbid Alterations.*—The softening varies according to the consistence of the cerebral substance, its colour, seat, extent, and number of the alterations. After having removed the calvaria, and incised the dura mater, the subjacent membranes are found loaded with serum. This, commonly contained between the pia mater and arachnoid, presents a gelatinous aspect; whereby many observers, some even of modern times, have been led into error, mistaking it for real coagulated gelatine. But such serum, although usually, does not invariably exist. In these rarer cases, the membranes are dry, and without perceptible change of colour. Sometimes they are

red and vascular; in the cases I have detailed, they were seldom found in a state of suppuration. Yet this may occur, in the same way as the pleura is seen covered by false membrane, when the pulmonary structure is diseased. Partial adhesion of the membranes to the softened portion of brain is occasionally met with, as in the cases recorded.

The degree of consistence of the brain is a quality extremely difficult of appreciation, at least in appearance. Yet when we consider that the natural compactness of the cerebral substance is generally well known to the experienced anatomist,—that the influence exercised upon it by age and temperament are also understood,—and that the changes effected by such causes are always general, and do not alter the colour of the encephalon,—one may surely distinguish from these modifications a partial softening, more or less extensive, almost constantly accompanied by change of colour in the altered portion, or in that adjacent to it.

The morbid consistence of the brain varies from that of liquid jelly to a degree of firmness nearly natural. The medium between the two extremes is most frequent. When the softening is considerable, it is very difficult of appreciation—at least if, as often happens, there exist no change of colour.

The colour of the softened portion may be yellowish, greenish, pink, red, brown, mulberry, or dead white. Several of these shades may exist together in the same individual. The greenish yellow colour is ordinarily found in cases where the softening is consequent on an old attack of apoplexy; and the centre of the lesion then exhibits this colour. The pink hue, with more or less of red, is observed in cases where the disease is primitive; and most commonly shows itself towards the circumference. The mulberry colour is not uncommon; it gives to the lesion the aspect of a scorbutic spot, or of a real ecchymosis. This must be an imperfect hæmorrhagic effort. I have never met with it in a simple state. The softened portion is frequently of a milk white colour. The whiteness of the medullary substance seems to have acquired increased splendour. This occurrence is not rare. Such are the colours I have most frequently observed: all the intermediate shades may be conceived to exist.

The softening may be superficial or deep-seated. On removing the membranes, if the lesion be superficial, (which commonly happens, for, when deep-seated, it often extends to the exterior,) the convolutions are found disfigured, as it were bloated, in a circumscribed part, or in the whole of one hemisphere, rarely in both; but always in an unequal manner. At other times, the change of consistence is announced by the alteration of colour of the cortical substance. This, instead of being of

a yellowish grey, is in some points pink, and almost always half only of the thickness of the substance. Much experience is required to distinguish these two shades of the cortical substance. On touching such parts, we find them evidently softer than those which have retained their original hue and figure. If we attempt to cut them with the scalpel, the angles formed by the segments are obtuse, rounded, and unequal: they have not the polish of those presented on slicing the healthy substance—a comparison which may always be made on the same brain, as the softening is never general. On passing the handle of the scalpel, or any obtuse body, over the altered portion, part of the substance is commonly removed: this never takes place when the consistence is natural. The superficial lesion may exhibit a greenish yellow colour at the same time with the other. It follows the convolutions, dips with them in their windings, and may extend beyond the cortical, or even the surface of the medullary substance. Its most common superficial extent is a circumference of two or three inches; but it may sometimes occupy half, or even the whole of a hemisphere.

But the morbid alteration is sometimes more deeply situated. Every part of the viscus is exposed to it. The corpora striata and optic thalami are most frequently affected; and after them, the central part of the hemispheres. I have seen but one instance of it in the septum lucidum; but Dr. Abercrombie seems repeatedly to have met with it there. Lastly, the cerebellum and cerebral crura are not exempt from it. I have never observed it in the spinal chord; but am persuaded, that many cases of supposed nervous paraplegia owe their existence to this lesion.

At these different depths, the softening may vary in extent. It may exhibit the volume of a kidney bean, (when less, it is not easily distinguished,) or invade great portion of the cerebral lobe. The middle condition is most common. The limits of the softening are far from being precisely marked; the centre being invariably softer than the circumference, and the latter resuming its natural consistence in a gradual and irregular manner.

In most cases the alteration is solitary; both hemispheres are rarely, though sometimes diseased. Then, one is almost always more so than the other, and seems to have been first affected. The same hemisphere may be softened, in different degrees, in several points. Lastly, it happens, as before mentioned, that there may exist a number of real violet ecchymoses, resembling scorbutic spots, and diffused at various depths in the cerebral substance. The softening may be combined with sanguineous extravasation. In many cases, it forms to the latter a kind of envelop; and sometimes, though seldom, it exists in a remote

part. It also may accompany cancer of the brain, and all the organic derangements of this viscus.

The ventricles frequently contain a considerable quantity of serum, which sometimes serves to divert the attention of the observer, and cause the disease to be mistaken for hydrocephalus, or serous apoplexy.

The arteries of the brain are usually ossified when this organ is softened.

CHAPTER VII. *Nature of the Disease.*—To restrain the sallies of imagination in penetrating the nature of diseases, is exceedingly difficult. Conjectures are too frequently taken for realities. In investigating the nature of the disease under consideration, we merely wish to inquire in what class it ought to be arranged; and whether it be a phlegmasia, or a disease of peculiar character. In this attempt, we shall adhere to the rigid observation of facts.

Inflammation is announced by *tumour*, *redness*, *heat*, and *pain* of the part affected. This definition, although in some cases inexact, it will be better, with the view of avoiding more serious errors, to admit. Some of these phenomena may, indeed, be wanting, and yet the inflammation actually exist; but these exceptions have sometimes been carried so far, that the presence of phlegmasia has been acknowledged where none of the characteristic signs have shown themselves. Many reasons induce me to believe, that cerebral softening is the effect of inflammation. 1. In some cases, there exists a very decided *pink colour*, which can only be the result of the inflammatory process. This colour, it may be objected, being seated only round the circumference of the softening, is simply consecutive to the lesion; but such objection is, perhaps, somewhat overstrained. 2. Fixed *headach* frequently precedes the disease. 3. *Tumefaction* can scarcely occur in the interior of the cranium: yet the convolutions are occasionally thickened; and the comatose symptoms are, doubtless, owing as much to the compression which results from this increase of volume, as to the local alteration of the encephalon. 4. The existence of *heat* it is impossible to ascertain, but the general febrile state may induce a suspicion of it; for very often the pulse is full, strong, and frequent, the skin warm, and the tongue dry. 5. The softening, in many instances, manifests itself round a sanguineous extravasation, and is consecutive to it. In this case, the softening may probably be referred to the inflammatory process which nature institutes around organic lesions of every kind, when they have attained a certain stage; or that which it produces around foreign substances, with a view of favouring their expulsion. Lastly, the obscurity in which the history of encephalitis is enveloped, and our ignorance respecting the organic alteration to which it gives rise, may, at

least, induce the suspicion that the softening is the result of it. In the article upon diagnosis, it will be seen that many of the symptoms indicate the inflammatory process.

Yet all the reasons just given in favour of the inflammatory nature of cerebral softening will not justify the conclusion, that it is invariably the effect of inflammation. In the first place, because, in most instances, none of the signs characteristic of this state exist. The diminution of contractility and sensibility, the paralysis, stupor, and impaired intelligence, are symptoms much more frequent than the opposite phenomena,—as contraction, convulsions, and pains of the limbs, and delirium. The latter, doubtless, announce an exaltation in the vital energies of the brain; but the first and most common indicate an alteration of an opposite nature. Frequently there exist neither headach, change of colour in the cerebral substance, tumefaction, nor febrile symptoms. It is then impossible to admit the presence of a phlegmasia. Lastly, this alteration takes place in aged persons, and under circumstances entirely opposite to those which give rise to inflammation. We may also add, that the softening of the structure, which it invades, is not a necessary effect of inflammation. Hence we are obliged to admit an inflammatory and a non-inflammatory softening—the latter consisting in a peculiar degeneration, which possesses its own signs and characters.

SKETCHES OF THE MEDICAL SCHOOL OF GÖTTINGEN.

Concluded from p. 415.

(London Quarterly Journal of Foreign Medicine and Surgery.)

Lectures on the Practice of Physic.

These lectures are delivered every morning at ten o'clock, by Professor Himly, in an auditorium connected with his dwelling house, and are generally attended by upwards of one hundred students. Two semestres are occupied by the course, the term of lectures therefore corresponds very nearly with those of Dr. Gregory, of Edinburgh.

Professor Himly has printed his "Lehrbuch der practishen Heilkunde" as a text book. This work is not completed, the first, and only volume published, contains nothing more than the development of his arrangement, which is founded on Schelling's obscure views of natur-philosophie, which has infected so many of the German schools; we shall not therefore attempt to give any detailed account of it to our readers.

The work is divided into two sections; the first contains

general nosology, and the second treats of materia medica. The latter section is really excellent, but the first appears, at least to our unphilosophical minds, quite useless. As to the lectures themselves, during the semestre in which we attended them, the professor was occupied with the second part of his course, in which he discussed affections of the stomach and alimentary canal, of the organs of respiration, circulation, generation, and lymphatic system.

If the hearer can separate the practical matter of Himly's lectures from his theoretical views, these lectures may be pronounced very good and useful. He is too much attached to a system, but his lectures contain in general a full account of what is known on the subject, and display great learning and research.

Professor Himly's clinic takes place from eleven to twelve every day. It is connected with a small hospital which is under his direction, founded by some inhabitants of Göttingen, and which derives its support partly from the interest of funds left for its maintenance, and partly from the cloister fund. There are about thirty beds in it. The principal part of the sick at this clinic are out-patients.

When we were at Göttingen Professor Himly also gave a course of medical surgery, from three to four, besides which he reads privatissima, to not more than five pupils, on diseases of the eyes, to which subject he has paid particular attention.

Professor Himly has not of late published any thing but his "Journal der Ophthalmologie." His text book is not published, being merely given to his students.

Lectures on Physiology, Comparative Anatomy, and Natural History.

These lectures are delivered, the physiology at eight o'clock in the morning, comparative anatomy from three to four, and natural history at five in the afternoon, by the celebrated Blumenbach, a name respected and venerated wherever it is known. Blumenbach was born in the year 1752, at Gotha, in Saxony, of parents who were in moderate circumstances. He commenced his studies at Gotha, from whence he went to Jena, where he remained two years and a half, and then came to Göttingen to study, under Haller, Richter, and Röderer. He took his degree as M. D. in 1776, at Göttingen, and then proposed to return to Gotha, with the intention of pursuing his profession; but his Dissertation, "de generis humani varietate," made so great a sensation, from the novelty of the subject, and the excellence of the execution, that on the same day that he received his degree, the University named him extraordinary Professor of Natural History.

Having thus obtained a situation which the natural modesty of his disposition rendered quite unexpected, he assiduously devoted himself to the study of natural history—with what success his numerous works and the splendid benefits he has conferred on science sufficiently testify. It was at this period that he began to form his collection of skulls, of which we shall immediately speak. It will be unnecessary to trace Blumenbach's rise, or to enumerate the various honours conferred on him; they comprise all the distinctions, which the gratitude of science, or the munificence of monarchy can bestow.

His cabinet of natural history is one of the most splendid in the world. It is entirely collected by himself, and forms, perhaps, the best monument of the esteem in which he is held, for he has never purchased a single article in it. It is kept in his dwelling-house, and occupies five rooms. Nothing can be more inappropriate than its situation, or more disorderly than its arrangement. The most valuable preparations are seen out of their cases lying about. There is no systematic arrangement in any part of it; but this is not to be wondered at, if we consider the progressive manner in which this collection has been formed, and the age of its possessor. Many would be happy to arrange it for him, and Dr. Wernekink has done much towards reducing the chaos to order, but Blumenbach does not like any setting to rights in his museum.

The part of his cabinet which attracts principal attention, is his unrivalled collection of human skulls. It has been visited not only by nearly all men of science, but by all the crowned heads of Europe. On this subject Blumenbach says, "If we wish to make great people follow us, and not we them, it is only necessary to make a collection of skulls." This collection is sufficiently known by Blumenbach's work, "Decas craniorum." The most valuable thing in it is a Grecian skull, which is at least 2,000 years old, a present from his pupil the Crown Prince of Bavaria. It is in a perfect state of preservation, and constitutes a most beautiful specimen of the beau ideal of the skull. The next in point of value are the skull of an ancient Roman, and that of a cannibal (Bataku), which he received from the Prince of Neuwied. Nothing can be more interesting than to view these three skulls, placed as they are by one another, and to compare their appearances with the moral differences of character of the nations to which they belong. In an anatomical point of view, the best preserved skull in the collection is that of a negro. On the same shelf stands the beautiful skull of a Georgian female, and some very rare skulls of the inhabitants of Nukahiva, a present of Captain Krusenstern. There is also a remarkable skull of a Cretin, which produces an indescribable feeling of horror, from its close resemblance to that of an ape.

We have not room to dwell upon individual parts of this collection; but shall merely remark, that it derives additional value from the care taken to authenticate the accounts given of its contents, and the skulls are preserved in the same state in which they were originally found.

Blumenbach's collection of fossil bones is one of the most beautiful in Europe. Our notice was particularly attracted to the bones of the bear, which bore the same proportion in point of size to the bear of present times, as the calf of one month to the ox of two years. There is also a very fine collection of minerals; and another, no less valuable, of skeletons, in which that of a lioness is very remarkable. The preparations in this cabinet, illustrating the growth of the elephant's teeth, are unique. His wet preparations are invaluable, of which we shall only say, that they are described in his "Abbildungen Natur-Historische-Gegenstände." We may, however, notice as interesting, the fœtus of a porcupine, and a crocodile escaping from the egg. We must not forget to mention his beautiful collection of drawings, descriptive of all nations of the earth; and an invaluable assemblage of curiosities which have no particular relation to science.

The following is a list of his principal works:—

1. Introductio in Historiam Med. Literariam. Göttingen, 1786.
2. Synopsis system. Scriptt. quibus inde ab inaug. Acad. G. Aug. 1737 usque ad 1787, discipl. suam augere stud. Profess. Med. Gött. Göttingen, 1788.
3. Med. Bibliothek. 3 Bde. Göttingen, 1783—95.
4. Institutt. Physiol. Göttingen, 1787.
5. De Vi Vitali Sanguini deneganda. Göttingen, 1788.
6. Geschichte und Beschreibung der Knochen. Götting. 1786.
7. Ign. v. Born—Zwey Abhdll. üb. d. Nutritibus-kraft. Petersburgh, 1789.
8. De oculis Leucaethiopum et iridis motu Comment. Göttingen, 1786.
9. De Generis Humani varietate nativa. Göttingen, 1776.
10. Collectio craniorum divers. Gentium. Göttingen, 1790.
11. Ueber d. Bildunstrieb u. d. Zeugungsgeschaft. Gött. 1781.

We dare not trust ourselves even to sketch the character of this wonderful man; for we should be afraid of saying too little, and our readers might think we said too much. There are two points in it, however, which are particularly deserving of attention and imitation. Neither in the whole course of his public lectures, nor in the frequent opportunities we had of conversing with him in private, did we ever hear him speak ill of any man, living or dead; and when, at the conclusion of his lectures on physiology, we remarked that we should not have supposed it possible to get through such a course without an

occasional severe remark on those who differed from him, he replied, that he considered science as a vineyard in which we were all fellow-labourers, and that when truth was the fruit to be gathered in it, it was beneath the dignity of a lover of truth to allow the irritation of his temper to interfere with such a noble pursuit. Blumenbach has no enemies, for it is impossible to quarrel with him.

At first view we should be surprised at another point in his character, united as it is with his extremely open and frank disposition. We allude to the philosophical caution which he displays in the adoption of any new theory or opinion. We have already given one specimen of this in the answer he usually made to those who inquired his opinion of Brown's system. Once, and once only, we believe, he was drawn from his habitual caution. Spurzheim was excessively anxious to have Blumenbach's opinion on his craniological system, and tried every expedient to elicit it in vain. At length he attacked Blumenbach on his vulnerable side, by bringing a beautiful skull as a present. This was irresistible. The collector struggled between his love of truth and his extreme fear of wounding the feelings of the craniologist. He looked at the skull, and exclaimed, "My dear Doctor, in your system there is much which is new and much which is true, but the new is not true and the true is not new."

Notwithstanding his incessant labours in his study and his cabinet, his three lectures a day, and the frequent visits he is receiving from strangers, nothing can be more affable or kind than his behaviour to students. He devotes to them the greater part of Sunday, and the evening of nearly every day, from six to nine o'clock, when he receives a certain number at tea. To the English he is particularly attached, having long been on intimate terms with Sir Joseph Banks, and many other distinguished characters. He speaks English perfectly, and possesses all the English works of great merit. He is equally well-informed in the other departments of knowledge; his acquirements seem indeed to be universal. He often realized to our imagination Pliny's beautiful description of Titus Ariosto:—

"How consummate is his knowledge both in the political and civil laws of his country! How thoroughly conversant is he in every branch of history and antiquity! There is no article of science, in short, you would wish to be informed of, in which he is not skilled. As for my own part, whenever I would acquaint myself with any abstruse point of literature, I have recourse to him, as to one who supplies me with its most hidden treasures. What an amiable sincerity, what a noble dignity is there in his conversation! How humble, yet how graceful is his diffidence! Though he conceives at once every point in

debate, yet he is as slow to decide as he is quick to apprehend, calmly and deliberately weighing every opposite reason that is offered, and tracing it with a most judicious penetration, from its source through all its remotest consequences."

Lectures on Midwifery.

These are delivered by Professor Osiander, and are perhaps among the best we have ever heard. They may be entirely depended on, for they are founded on a long course of accurate observation. His text book is intitled "Osiander's Lehrbuch der Entbindungskunst," which is not yet entirely completed. It promises to be the best work on the subject. Professor Osiander gives two courses in the year, each of which lasts about five months; these are combined with chemical instruction in the hospital.

The Lying-in Hospital is the finest building in Göttingen, and is admirably adapted to the purposes for which it is intended. Besides the accommodation for patients, it contains apartments for the professor, his beautiful cabinet, and an appropriate lecture room.

Nothing can form a stronger contrast to the chaos of Blumembach's collection than the exquisite arrangement of Professor Osiander's. It contains a most valuable series of preparations, chiefly illustrative of his particular department. The room in which it is contained is elegantly fitted up, and the preparations, arranged in the most beautiful order, are all ticketed, with a reference to the catalogue. This catalogue consists of seven folio volumes of MS. and to each number is affixed a complete history of the case of the patient from whom the preparation was taken. Professor Osiander owes this beautiful, we had almost said unrivalled, collection to his own industry. He told us that he had often in his younger days gone without his dinner, to purchase the glass and spirit for some new preparation.

We shall not at present enter into a detail of Professor Osiander's opinions or practice, as we propose shortly to review some of his most important works. Although he has educated the greater part of the accoucheurs of Germany, yet this "genus irritabile" are ungrateful enough to make him the constant subject of keen attacks, which he bears with exemplary patience. He is in immense practice, and so great is his fame that he is often sent for to the distance of hundreds of miles for consultations.

The lectures on botany are delivered by Professor H. A. Schrader, from seven to eight in the morning. The botanical garden is one of the most perfect and useful in Europe, the Hanoverian government paying great atttention to its maintenance.

The lectures on chemistry are delivered by professor Stromeyer, who, since Klaproth's death, may be considered as the first analytic chemist in Europe. At the latter's death, the Prussian government offered Professor Stromeyer his place at Berlin, but the Hanoverian government making a considerable addition to his salary, he preferred remaining in his present post. He is as good a teacher as chemist, and is peculiarly attentive to his students. Independent of his lectures every day, he exercises the pupils twice a week in experimenting in an excellent laboratory.

We may also here mention Professor Hausmann, whose lectures on mineralogy, and whose collection, are well worthy the attention of the curious.

The lectures on general science and literature are excellent, and every facility is afforded, in this interesting university, of cultivating the higher branches of our science in a manner which is almost unequalled.

Some Observations on the Origin, Nature, and Prevention of Typhus Fever. By John Armstrong, M. D. Physician to the London Fever Hospital, and Lecturer on the Principles and Practice of Physic.

(From the Medical Intelligencer, for May, 1822.)

As circumstances have occurred which will delay the publication of an advertised work which I have long been preparing for the press, and as typhous fever has again made its appearance in Ireland, it is incumbent upon me now to lay before the profession the result of my researches, in regard to the origin of that malady; and if the inferences, which I have most deliberately drawn from an extensive collection of facts, be correct on this important subject, they will lead to clearer views respecting the real nature of typhous fever, and to more certain and efficacious means respecting its prevention.

In 1819, I attended a patient labouring under an intermittent fever, which, in its progress, put on a remittent character, and that again assumed the continued character, but with all the most malignant signs of what is usually denominated typhous fever. This case made a very deep impression upon my mind, and it then occurred to me, for the first time, that intermittent, remittent, and typhous fever, might, possibly, be modifications of one and the same disease, and that, possibly, the strong prejudice of education, and my own inherent pride, might have hitherto prevented me from investigating the primary source of this disease, with that simplicity and purity of mind, which

the science of medicine requires. Up to this period, I had firmly believed, that human contagion was the sole cause of genuine typhous fever, but a doubt having been thus excited, I determined, if possible, to leave my mind free from all bias for the future, and then endeavoured to commence my inquiries respecting the origin of typhous fever, as if I had previously known nothing of the subject. Nearly three years have now elapsed, and within that term a very great number of cases of typhous fever have fallen under my observation, and I have spent much time in accurately recording their symptoms, and in endeavouring to deduce legitimate conclusions, not only from them, but from the various circumstances with which they were connected in their rise and progress. This investigation has most decidedly led me to the conclusion, that what the Italians vaguely call *mal aria*, and the English as vaguely, *marsh effluvium*, is the primary source of typhous fever, and I will now state the substance of the facts upon which this proposition is so confidently advanced.

First, The intermittent, remittent, and what is called continued typhous fever, pass or repass, into each other, as numerous cases in my possession indisputably show; and, secondly, the remittent fever, from *mal aria* or *marsh effluvium*, has a combination of symptoms exactly similar to those which occur in continued typhous fever, and which, *as a combination*, occur in no two other affections whatever, so far as I have been able to ascertain from the most minute examination. But some remarks will be necessary fully to illustrate this particular and most important point.

The intermittent fever is marked by a successive cold, hot, and sweating stage, followed by an intermission, and occurring again after a certain interval. All medical writers allow, that what is called the marsh remittent fever is a modification of the intermittent, though in the former, the cold stage is absent; and indeed, we so frequently see these affections exchange characters, as to leave no doubt on the subject. The relation between the remittent and the intermittent is not more intimate than the relation between the remittent and continued typhus; so that if I were now obliged to make a nosological arrangement, I should call the disease intermittent, remittent, or continued typhus, according to the type which it assumed. In tracing the history of many of the cases backward of remittent or continued typhus, I have found that they commenced as intermittents, and I have seen many cases of the remittent run into the continued typhus; and, on the contrary, I have known the continued typhus become remittent or intermittent. But though the continued, remittent, and intermittent forms of this disease constitute its leading varieties, yet each of these forms is occa-

sionally liable to certain deviations in its course, which cannot be correctly arranged under any systematic divisions of the schools. But at present I shall not allude to these occasional aberrations, as my main object is to establish the identity of marsh remittent, and continued typhous fever, and therefore I shall examine each under the symptoms which they observe in their regular and unequivocal forms.

The remittent form, as it occurs in this country, is always attended by a simultaneous affection of the brain, mucous membrane of the air-passages, mucous membrane of the alimentary canal, and of the liver; and this peculiar combination of symptoms is accompanied by as peculiar a lassitude of mind and loss of muscular power. The affection of the brain, among other signs, is denoted by a dropping of the upper eyelids, which, therefore, cover a larger portion of the globe of the eyes than natural; while the eye itself is more glairy than in health, and yet it conveys an expression of dulness or indifference of mind, so that there is a remarkable mixture of physical brightness and intellectual muddiness in the expression of the countenance. It is difficult to convey this mixed expression in words, but any practitioner who has once seen it could hardly mistake it again. The affection of the lining of the air-passages, is partly marked by some preternaturally purplish hue of the lips, attended with more or less huskiness of the voice, more especially observable when the patient coughs; and the cough is usually slight or severe according to the degree of the affection of the lining of the respiratory passages. The affection of the mucous membrane of the bowels and of the liver, is generally marked by the evacuations from the bowels being mixed with glairy mucus and dark bile, which often resembles brown melted resin. There is also frequently some obscure abdominal uneasiness on pressure, especially about the pit of the stomach. The tongue is covered by a dirty whitish fur in the centre, and its edges are usually redder than natural; but in the progress of the disease it often becomes brownish in the centre, and the breath, more particularly in cases of the continued type, has almost always a peculiarly sickly odour.

The lassitude of mind, and the prostration of strength, are closely connected with the state of the mucous membrane of the air-passages and the affection of the brain; for the lassitude and languor are always the greatest in those cases where this combined affection is the most strongly indicated. This lassitude and languor are also remarkably indicated by the voice, manner, position, and motions of the patient. The remissions, when distinct, occur under two circumstances. The patient either becomes gradually or suddenly hot; and the hot paroxysm most frequently comes on towards evening, continues

through the night, and terminates commonly towards the morning, the skin at that time becoming moist and moderately warm, or quite cool, but not moist; while the pulse in both instances becomes slower, softer, and of less volume than during the hot paroxysms. Now the only difference between the remittent fever and continued typhous fever, is, that in the latter, as it appears in adults, the symptoms are more severe, and the remissions are entirely absent; the skin being hot or warm, and the pulse quicker than natural during the whole day and night, though even in that form, the pulse and heat are highest at the latter period.

The combined affections, then, of the brain, lining of the air-passages, lining of the alimentary canal, and of the liver, together with a peculiar lassitude and languor, are the true diagnostic signs of the remittent, and continued forms of typhous fever. Other parts may be and sometimes are simultaneously affected, but, if we except the spinal cord, the affections of those parts are not essential, but accidental occurrences. The continued form of typhus in particular is liable to considerable variety in its expression, as the disorder may predominate most in the brain, lining of the air-passages, lining of the alimentary canal, or in the liver; but still an accurate observer cannot fail to recognise the disease from the coincidence of the above signs, though they may be slight or severe. The morbid appearances also are correspondent to the symptoms, for dissection in mortal cases shows the remains of some disorder in the circulation of the brain, lining of the air-passages, and lining of the bowels, varying considerably in degree; but it is curious, that though the secretions of the liver are so generally disturbed during the progress of the disease, yet seldom any traces of organic mischief are exhibited in that organ. Certainly one of the most remarkable peculiarities of typhus, particularly under its continued form, is the affection of the mucous membrane of the bronchia; and I could show, from many facts, that it is the main cause of the varying degree of heat, of muscular and mental disturbance, and that it not only gives rise, in the advanced stages, to the peculiar dryness and darkness of the tongue, but that, it is connected intimately with those symptoms which have been termed malignant, and which the older writers found so difficult to explain on any thing like rational principles. The want of due decarbonization of the blood is the cause of many of the most remarkable symptoms attendant on typhus; but the degrees in which this process is impeded are not always proportionate to the degrees of mucus accumulated in the bronchial tubes, and spread over their lining; for in some instances the secretion on the tongue, and on the fauces, is a sort of sticky varnish, and this same secretion, seemingly, exists occasionally

on the mucous membrane of the respiratory passages, when little mucus is, comparatively, accumulated there. Blood, not duly decarbonized, operates more or less as a narcotic on the brain, and tends materially to influence the animal heat and the heart's action; and hence partly arise, in the progress of strongly marked cases of typhus, the muddled state of the brain, the smothered heat of the surface, and the soft compressible pulse, which become its concomitants, however high the excitement may have been for the first three or four days.

It might be interesting to know, why in one person typhus assumes an intermittent, in another a remittent, and in a third a continued character. Perhaps this may depend upon two circumstances; first, upon the degree of concentration in which the poisonous miasm is applied, and, secondly, upon the condition of the body at the time of its application. If the miasm be applied in a low degree of concentration, or if it be applied to a subject whose internal organs are sound at the time, it seems to produce an intermittent fever; but if it be applied in a very concentrated form, or especially if it be applied to a subject whose internal organs are weak, then it puts on the remittent, or the continued character; for I have ascertained, beyond doubt, that the remittent and continued form of typhus are complicated with internal inflammation, separately or combinedly, in one or other of the four parts before specified, the inflammation being more intense in the continued than in the remittent typhus. Internal inflammation, then, is probably the immediate cause why typhus puts on the remittent, or continued character. In large towns, but particularly in London, the *mal aria*, or marsh effluvium, as it is too vaguely called, is probably applied in a much more concentrated state than in country districts, owing to the close, crowded, dirty, and ill-ventilated state of the habitations of the poor. The poor themselves in London, too, on account of their more dissipated habits, and the more anxious condition of their minds, have very often latent weaknesses about the internal organs:—hence, when they are exposed to the influence of this *mal aria*, or marsh effluvium, the subsequent shock most frequently gives rise to some visceral inflammation, and hence the disease so very often assumes the remittent or continued type in the metropolis; though I have facts to show that the intermittent form of the disease is more common than many practitioners imagine.

The only objection, which has struck me, to this view is, that the miasma which produces the intermittent form may be originally human, and not marsh miasma, because the ill-ventilated habitations of the poor will as certainly confine the effluvium of the human body as it will marsh miasma. But after the immense body of evidence which Dr. Bancroft has collected, to

show that human effluvium, however concentrated, does not produce typhus or contagious fever, it seems much more philosophical to conclude, that it is the concentration of marsh, and not human miasma, which originally produces this disease. Besides, it is an important fact, that if the earth be bound up for some days by a hard frost, typhus fever ceases to exist in districts where it before prevailed, though the people are then as much, or even more crowded together, which shows that something is necessary for the generation of the cause of this peculiar disease, different from human effluvium.

The intermittent form of the disease, too, arises in situations where there is no reason whatever for suspecting the existence of human contagion, as, for instance, in well-known places in various parts of England. The same remark as forcibly obtains in regard to the remittent form of the disease, which abounds in some places where the poisonous exhalation of the earth is known to prevail; and as the continued form of the disease is only an aggravated one of the remittent, as it has all its peculiar, pathognomonic, distinguishing signs, which do not, combinedly, exist in any other disease, the identity of the continued with the remittent form of the disease appears to me satisfactorily established.

It is, I know, a common opinion, that what is called, in general terms, fever, varies so much in its expression, that its characters cannot be delineated so as to present kindred and cognizable features; but all the observations which I have made respecting the disease, lead me to the conclusion, that the same causes always present similar results under similar circumstances. Only, for example, ascertain the various forms which small-pox assumes, and the various circumstances under which those forms occur, and it will be found that they observe certain and regular laws. It is so with respect to all other diseases, but particularly so with respect to typhous fever, the symptoms of which are as strikingly uniform, in its leading varieties, as those which occur in small-pox, or in any other disease known to proceed from one specific source.

The effects of *mal aria*, when connected with fever, are, according to my observation, as uniform as the effects of the peculiar matter of small-pox, when that disease is connected with fever; and this identity of regular effects is as strong a presumption of the identity of the cause in the one as in the other. If it were taken for granted, by way of argument, that the peculiar matter of small-pox, like the peculiar matter of typhus, primarily arose from a source entirely external to the human body, it then might be urged, that as the former still produces the same regular effects when it has passed through one body to another, so something similar ought to occur in regard to *mal*

aria, if that be the primary source, not only of intermittent and remittent, but of continued typhous fever. That *mal aria*, as a morbid exhalation of the soil, produces intermittent, remittent, and continued typhus, I have abundant facts to show, which shall be given in detail at a future period; and as I have met with the distinctly remittent and continued form of the disease, in persons who had been, to all appearance, decidedly infected from others labouring under continued typhus, the parallel between small-pox and typhus would still seem to hold good, even under such a point of view. Since my attention, however, was fully awakened to the primary source of typhous fever, the unequivocal cases in which one patient appeared to me, unquestionably, to infect another, have not been very numerous, and if they had, I think it probable that some of them would have put on even the intermittent type, if I might form an opinion from what I have remarked of those cases which primarily arose from the *mal aria* of the soil.

Both the peculiar matter of *mal aria* and the peculiar matter of small-pox, produce a greater diversity of symptoms than systematic writers have described, because the effects of both are influenced by circumstances which those writers have not taken into account, and which still afford an ample field for investigation; but I here only wish to reason from the more constant and regular effects of each, as they have been presented to me in this climate, since these effects are the most obvious, and, therefore, the best fitted for the purposes of the present exposition.

The causes of all acute diseases are common or peculiar; and if we accurately trace the effects of those which are peculiar, we may always select and arrange some which constantly arise from each peculiar cause, and which thus enable us to ascertain the existence and operation of that cause with great precision.

From the explanation which I have given of the origin of typhous fever, it is natural to inquire whether or not it be contagious. With respect to this circumstance, I also resolved to be entirely guided by the facts which came before me; for as soon as I satisfactorily discovered that I had formerly fallen into an error respecting the primary source of typhous fever, it became quite necessary to guard myself against that enthusiasm which so often makes converts pass from one extreme to the other. On mature reflection, however, I could not help perceiving, that what I formerly considered as decisive or probable proofs of the contagious nature of typhus, had not really the force which I then ascribed to them; for example, when I saw one person attacked with typhus who had visited another labouring under that disease, or when I saw person after person attacked in the same house or situation, I imagined that this

circumstance formed a strong, nay a decisive evidence, in favour of the disease propagating itself from person to person; but it must be apparent, from what has been said, that this particular circumstance meets with as satisfactory a solution on the principle that the persons thus affected had been, in their turn, exposed to the *mal aria*, or marsh effluvium, by which the first had been affected. Indeed I have every reason to believe, that great numbers are actually affected in this manner who live in the same house or district, as the disease so often commences with the intermittent or remittent form; but, at the same time, it is right to confess that facts have fallen in my way which have led me to conclude, that the disease under some circumstances, does propagate itself by contagion. Speaking from my own observation, I could not take upon me to say confidently, that the distinctly intermittent or remittent form are contagious; but I have met with cases, where the continued form of the disease, in which the secretions are the foulest, certainly appeared to propagate itself by contagion.

Among others which I could adduce, I will mention one instance for the sake of illustration. A very respectable woman, who performed the office of a nurse to some patients labouring under typhus, was assisting one of them from the night chair, and she became sick at the stomach, and faintish, from the offensive odour of the evacuation which he had just passed from the bowels. From that time she drooped, and a few days afterwards had a severe attack of continued typhus, characterized by its peculiar combination of symptoms. This is a striking instance, and I have met with some others which were equally, or even more striking. The probability is, that its contagious or non-contagious nature is dependant, first, upon the quantity, or concentration, of miasm thrown off from the body; and, secondly, upon the closeness or openness of the situation in which the patient may be placed; at least the result of my observations would go to prove that its propagation by contagion, or non-propagation, is almost entirely dependant upon surrounding circumstances.

Several cases have come before me which have appeared to me to identify the typhous fever of this country with the marsh remittent yellow fever of hot countries, where violent disputes have arisen about its nature, some contending that it is, and others that it is not contagious. But the disputants would do well to view the subject more dispassionately, and to take into consideration the different types which the disease assumes, and, above all, the circumstances which favour or prevent the propagation of a disease by human contagion. In hot countries the secretions of the body are soon dissipated by the surrounding heat, and the modes in which the houses are constructed and

ventilated are admirably adapted to prevent the spread of any contagious disease, even the small-pox; whereas, in this country, at least among the poor, their dwellings are so small and confined that they may be considered as nurseries of any contagion which may arise there, while the custom, not observed in hot countries, of having curtains about the beds, is calculated, first to retain, and then to give out, any contagion which might arise from the patient. These and similar circumstances ought all to be taken into account in estimating whether or not the marsh remittent of hot countries be a contagious disease.

There is an opinion very prevalent in this country, that any fever originating from a common cause, such as cold, heat, intemperance, or the like, may become contagious in its progress. This opinion has probably acquired all its force from the prejudice of education, for it has happened in physic, as in other departments of human knowledge, that men believe certain things merely because they have been taught to believe them; and it is too humiliating, in general, to acknowledge that as an error which has been long cherished as a truth. This feeling has greatly tended to impede the progress of my own mind, but I could wish, above all things, to weed out every vestige of prejudice or pride, that I might have no discolouring or distorting medium between me and nature; but that, on the contrary, I might be enabled to see things as they really are, and to investigate them in the spirit of sincerity.

It is truly and beautifully observed, by Dugald Stewart, that the impressions and associations of our earlier life may be likened to the slender threads which fastened Gulliver to the earth; and that they are to be overcome, not by a sudden exertion of intellectual force, but by the gradual effects of good education, in breaking them asunder one by one. In regard to the point in question, that any fever originating from a common cause may become contagious in its progress, I cannot but believe it to be a fallacy resting chiefly on the sanction of speculative authority on the one hand, and passive credulity on the other; at least, I have never seen any fever which originated from a common cause become contagious in its progress.

If we attempt to draw our notions respecting the true diagnostic signs of typhous fever from the great medical sophist of modern times, Dr. Cullen, we shall be led into nothing but error; for his definitions of synocha, typhus, and synochus are, according to my observation, mere metaphysical abstractions, which have no reality in nature. What would seem to be meant by the word synocha is an intense fever, combined with some visceral inflammation; but inflammation did not suit Cullen's arrangement, and therefore the very essential upon which such a fever always depends is omitted in what he has

called a definition, but which, in fact, is only a brief and most imperfect enumeration of symptoms. What would seem to be meant by the word typhus, is that combination of symptoms which occurs toward the close of any fever where the brain has suffered much, and where the powers of life are about to give way; but this is not typhous fever, and indeed we find that Cullen's definition does not include one genuine characteristic of that disorder, if the epithet contagious be omitted; and its contagious character is probably dependent upon circumstances which are adverted to before.

The mischief of adhering to Cullen's supposed definition of typhus has not been confined to this, that many men have not known what the genuine indications of typhus are, but an unnecessary alarm has been created, lest any common fever may become typhus in its progress, since Cullen expressly makes typhus to arise out of another disease: but do we ever see figs spring from thistles? or, to speak more closely, do we ever see measles arise out of small-pox or scarlet fever? nay, did any man ever see true typhus propagated from any one of those diseases, even when they were accompanied with what Cullen has vaguely designated typhous, or typhoid fever?

If my observations be correct, it follows that typhous fever originates from one species of what is called *mal aria*, or marsh effluvium. The fact of intermittent, remittent, and continued typhus passing and repassing into each other, proves their common origin; and I infer, that this peculiar miasm is the sole cause of this disease, because I have never seen the combination of symptoms which it produces, in the remittent and continued forms, arise from any other cause. These symptoms I consider as peculiarly characteristic as those which attend small-pox or measles, and I firmly believe, that they arise from as single a cause. Small-pox, measles, and scarlet fever appear in all the districts of London apparently alike; but typhus is most remarkably prevalent, year after year, in particular districts. The cause is, that typhus alone arises, primarily, from a *mal aria*, or marsh effluvium, which is most abundantly generated in those particular districts, where many, or even most of the poor inhabitants are rendered prone to its influence by a bodily debility, the product of bad food, pernicious habits, defective cleanliness, bad clothing, and the like enervating circumstances.

Whatever weakens the body predisposes it powerfully to typhous fever; and hence, during the prevalence of general distress among the poor, typhous fever will be sure to appear, provided the situation and season be favourable for the generation of *mal aria*, or marsh effluvium. So intimate is the connexion between the state of the atmosphere, and the rise and decline of

typhous fever in the infected districts of London, that I have often, with tolerable accuracy, predicted its increase or decrease in those districts; and I am sure that I could, in future, predict this with still greater precision, if I always knew the degrees of predisposition existing there, from physical and moral causes. In the course of some months, I shall have occasion to detail the whole facts in my possession, and then I shall offer what appears to me most interesting, respecting the circumstances under which this peculiar poison is generated.

This view of typhous fever not only leads to some important considerations respecting its prevention, but it is likewise calculated to remove that universal alarm which the unqualified doctrine of contagion always excites. If any man were to ask, why typhous fever prevails so much in some districts of London, and so very rarely appears, in solitary examples, among other districts, he will find a satisfactory answer to that question in the difference of localities: the infected districts being, in general, comparatively low, closely built, badly ventilated, imperfectly drained, and filthy, while the very contrast of this description mostly obtains in those districts which are freest from *mal aria*, and through which, as now constituted, typhous fever never has extensively prevailed, nor never can extensively prevail.

It has become the custom to establish fever institutions, and this cannot be too much applauded and recommended; for such institutions afford the greatest benefits to the sufferers themselves, and protect the public, to some extent, by removing certain cases which might be propagated by contagion.—But if fever institutions be solely relied upon as preventives of the spread of typhous fever, they will necessarily lead to a very imperfect result, inasmuch as the primary source of the disease would then be disregarded; and it therefore follows, that the most important thing to be performed in the way of prevention, is first, to remove all those circumstances, as far as possibly can be done, which favour the generation of *mal aria;* and, secondly, to remove, in like manner, the predisposing causes among the poor, which lay them so open to the influence of this noxious agent, by debilitating their bodies.

The government of this country acts wisely in leaving most public institutions of a benevolent kind to the public; but as typhous fever not only regards the welfare of the individual, but of the community at large, it has a peculiar claim to the attention of the legislature; and I am so satisfied about the primary source of this disease, that I believe, if the legislature were to take up the consideration of the subject, on the grounds above suggested, the prevalence of typhus would be shortly lessened, not only in London, but in Ireland, or in any districts where it is wont to appear in the United Kingdom.

If *mal aria*, or marsh effluvium, be the primary source of typhous fever in London, it is probably the primary source of typhous fever all over the world.

In the present advanced, and still advancing, state of chemical science, it is not, perhaps, hoping too much, that something may be accomplished towards ascertaining the nature of this *mal aria;* at all events, by drawing the attention of scientific men towards it, many facts will be elicited which may prove highly useful, as far as the prevention of typhus is concerned.

Before closing these desultory remarks, I cannot help suggesting to those who may practise where the plague prevails, the propriety of ascertaining whether or not that disease be really a modification of typhous fever. Till the time of Procopius, the word plague seems to have been applied indiscriminately to any febrile disease which happened to be extensively prevalent; but since then, the best authorities seem to have limited the term to that fever in which buboes and carbuncles are apt to appear. Between the most accredited histories which we have of the plague, and many of the symptoms of typhous fever, there is a most remarkable similitude; but it is right in me to state here, that I have never seen, or, it may be, have never noticed, an instance of typhous fever where the glands of the groin were affected, though I have seen several in which the parotid glands were affected, and some in which carbuncles existed. But as I have never been in foreign countries, I can only recommend others to pursue the inquiry here suggested, and would wish it to be pursued strictly through the investigation of facts; for the past annals of physic abundantly show, that the secrets of nature are not to be developed by any ingenious speculations carried on in the closet.

The discovery and communication of truths connected with physic, have been the leading objects of my professional life; and being now fully persuaded that I formerly committed an error, in supposing human contagion to be the primary source of typhous fever, it becomes a duty in me to acknowledge that error without reservation. A certain degree of warmth, moisture, and the decomposition of vegetable matter, have appeared to me essential for the generation of *mal aria;* and its suppression, or diminution, will perhaps be found chiefly to consist in establishing proper drains, in removing putrid accumulations of vegetable matter, in instituting every species of strict cleanliness, and in freely ventilating the habitations of the poor. The preceding view of the origin of typhus, would lead to important considerations in the future construction of the houses of the lower orders, but I shall enter fully into these hereafter; and shall at present only observe, that whenever typhous fever does prevail, it will be important, not only to separate the sick

from the healthy, but to remove, if possible, those physical and moral causes, which by debilitating the body, so powerfully predispose it to be acted upon by this noxious miasm.*

Southampton Row, Russell Square,
May 27, 1822.

On the Efficacy of the Bark of the Pomegranate Tree, in Cases of Tænia. By P. Breton, esq. Surgeon to the Rhamgur Battalion in the East Indies.

(From the Medico-Chirurgical Transactions, Vol. xi.)

Having observed in Dr. Fleming's catalogue of Indian medical plants and drugs, that the decoction of the bark of the pomegranate root is ranked as an efficacious remedy for the removal of the tape worm, I had afterwards an opportunity of putting its effects to the fairest test of experiment.

For several days my Kidmutgar complained of symptoms which I conjectured to be those of tænia. The fact having been subsequently confirmed by the appearance of fragments of the worm, I immediately determined on making personal trial of the remedy prescribed in Dr. Fleming's book.

Accordingly I prepared a decoction of the fresh bark of the root of the pomegranate tree, by boiling two ounces of it in a pint and a half of water, to three-fourths of a pint, and when cold, I administered a glassful of it at 8 A. M., repeating that quantity every half hour, till four doses were taken. About an hour after the last dose, an entire tænia was voided alive, measuring nearly eight feet in length.

It may be worthy of remark, that in this instance, the decoction occasioned only a very trifling nausea; notwithstanding which, it had the effect of dislodging and bringing away the worm entire at the expiration of three hours from the first taking of this remedy.

I transmitted to Dr. Fleming an account of this case, with the view of adding one to the number already communicated to him by others, in proof of the efficacy of the decoction, when prepared with a smaller quantity of the bark than is usually

* As some months will elapse before I shall be able to lay before the profession the detail of the evidence upon which the foregoing conclusions rest, in reference to *mal aria*, I should feel particularly obliged by the communication of any facts bearing at all upon the subject here discussed. The ascertainment of truth is my sole object; and if I should, therefore, be favoured with any communications respecting the effects of *mal aria*, or human contagion, I could wish that they might, if possible, be divested of all undue partiality or prejudice of mere opinion, so that they may tend, substantially, to support or oppose the inferences which I have put forth for the sake of promoting further inquiry.

prescribed. This is certainly a fortunate circumstance, as it obviates any derangement of the system, or any unpleasant sensation whatever, excepting only a very trifling degree of nausea.

Case II.—May 3, 1811. Gheesa, a native, says that, for a long time he had experienced sensations which induced him to believe he was troubled with worms, and for the last four months he had actually been in the habit of passing fragments of them.

The species of worms of which he complained, having been ascertained, I thought it a fair opportunity of trying the effect of the dried bark of the root of the pomegranate tree; and accordingly I prepared a decoction, by boiling two ounces of it in a pint and a half of water to three-fourths of a pint, of which I administered a wine glassful at 8 A. M., repeating that quantity every half hour, till four doses were taken. About ten o'clock the man complained so much of sickness at stomach, giddiness and uneasy sensations in his bowels, that I was deterred from giving him a fifth dose. About half an hour after 10 he complained of faintness, and vomited a little. A few minutes after 11 A. M. he voided an entire tænia alive, measuring nineteen feet two inches in length. Immediately after passing the worm, he was affected with faintness and universal tremor, and felt sick for several hours after.

This case affords abundant proof of the efficacy of the *dried* bark of the pomegranate root, and of its great activity in removing tænia. It seems also to warrant the conclusion, that the decoction made of two ounces of the *dried* bark is rather too powerful, and that the exhibition of it may, possibly, be attended with some danger. I am therefore of opinion, that a smaller quantity of the *dried* bark would answer the same purpose, without exciting a train of sensations so distressing in themselves. This inference is collaterally supported by the circumstance of the *recent* bark sustaining a considerable diminution of weight by the simple process of drying in the sun, so that by the dissipation of its aqueous or sappy particles, its active powers are condensed and united. To ascertain precisely the difference of weight between the fresh and dried bark, I examined a number of papers, each containing two ounces of the recent bark, taken indiscriminately out of a basket, and found that the medium loss of weight of each paper in drying, amounted to seven drachms.

The patient above-mentioned is a butcher by trade, of a robust constitution, and forty years old. The quantity of decoction given at each dose was two ounces, measured by a graduated glass measure.

Cases III & IV.—May 4th. Peer Bukhs, a boy about seven years old, and Phursand, a boy about ten years old, had passed fragments of tænia for upwards of six weeks.

At 8 A. M. they commenced taking one ounce of the decoction of the dried bark of the pomegranate root, (made by boiling one ounce and a half of it in a pint and a half of water, to three-fourths of a pint,) and repeated this quantity every half hour, till six doses were taken, without however any other disagreeable effect, than a trifling sickness at stomach, and a little vomiting three or four times. In consequence of the vomiting I thought it prudent to suspend a further use of the decoction. At noon, on finding that the children had a good deal recovered from their unpleasant sensations, and conceiving it probable that the remedy would in this instance fail to produce the desired effect, in consequence of the children having rejected their medicine twice or three times immediately after taking it, I determined on preparing a little more of the decoction, by boiling half an ounce of the dried bark, in twelve ounces of water, to six ounces. This I administered as before, in doses of half an ounce to each of the boys, at 1 P. M., at half past one, and at 2 P. M. Shortly after, they both complained of considerable giddiness and faintness, which induced me to desist from a farther repetition of the decoction.

At about 5 P. M. however, or three hours after the last dose, I had the gratification to find, that one of the boys (Peer Bukhs) voided a broad thick tænia, measuring fifteen feet four inches in length; at a little after six, the other boy (Phursand) passed a similar tænia, entire and alive, measuring fourteen feet two inches.

There was so little variation in the external expression of feeling of these two children, and the general effects of the decoction were so similar in both, that for the sake of brevity, I have preferred reciting the two cases together. But it may be observed, that a temporary suspension and renewal of the medicine may be successfully adopted under similar circumstances.

Case V.—May 5th. Jhamoo, a boy aged nine years, commenced at 8 A. M. taking twenty grains of the pulverized bark of the pomegranate root, mixed with one ounce of water, repeating this quantity every hour, till five doses were taken. At forty minutes after twelve, an entire tænia was brought away alive, measuring nine feet eight inches in length.

Case VI.—May 5th. Jumbee, a girl ten years old, took at 8 A. M. the same quantity of the pulverized bark mixed with an ounce of cold water, and repeated the dose every hour till

noon. At 24 minutes after 1 P. M. a tænia lata was discharged alive, four feet nine inches long. The next morning at about 9 A. M. an entire tænia solium was voided dead, measuring nine feet ten inches in length.

In these two instances a little nausea only was occasioned, and three or four copious motions in the course of the forenoon.

These two cases furnished positive proofs, that the powder of the bark of the pomegranate root is equally efficacious with the decoction of it, either in its dried or recent form. This is really a fortunate discovery, because it seems to operate mildly when administered in this form, and is of great importance with reference to economy, for in these two last cases, only ten scruples of the pulverized bark were expended, whereas, if the decoction had been prepared, twelve drachms of the bark would have been consumed.

Case VII.—May 6th. Soobhun, aged 22, who had for many years continued to pass small portions of the tape worm, took at 8 A. M. two scruples of the powdered bark of the pomegranate root, mixed with two ounces of water, and repeated that quantity every hour, till six doses were taken without any other effect than trivial nausea. At a little after 4 P. M. he voided a tænia lata alive, six feet seven inches long.

Case VIII.—May 8th. Bundoo, aged 30, who had passed fragments of the worm for upwards of five years, took at 8 A. M. two scruples of the pulverized bark mixed with two ounces of water, and repeated the dose every half hour till 11 A. M., when it was suspended in consequence of a little sickness at stomach and giddiness. At a little after one, an entire tænia was expelled, which measured fifteen feet three inches in length.

In this case I exhibited the powder every half hour, with the view of ascertaining whether it would cause a more speedy expulsion of the worm, than when administered every hour. The fact is verified in this instance, but no conclusive judgment can be formed from a solitary case.

Having procured live tæniæ (as well as fragments of them which had been passed previously to the exhibition of medicine) I was very desirous of witnessing the effect of the decoction of the pomegranate root, and also of a mixture of the powder of it with water, when applied in immediate contact with them. The instant they were plunged in these preparations, they writhed, and otherwise manifested great pain, and died in the space of five minutes. In plain water these worms will live several hours after expulsion.

Selected Reviews.

ARACHNOID INFLAMMATION, CEREBRAL AND SPINAL.

Recherches sur l'Inflammation de l'Arachnoide, Cerebrale, et Spinale; ou Histoire Theorique et Pratique de l'Arachnitis. Ouvrage fait conjointement par PARENT-DUCHATELET, M. D. Medecin en Chef de la 4e Legion de la Garde Nationale, &c. et L. MARTINET, M. D. &c. &c. One large volume, 8vo. pp. 612. Paris, 1821.

(From the Medico-Chirurgical Review, for March 1822.)

———— quid nobis certius ipsis
Sensibus esse potest, quo vera ac falsa notemus.—LUCRET.

That there cannot be a more important subject of investigation than that which occupies the volume before us, must be admitted by every one. The brain, as the organ which unites our moral and physical natures, exercises unbounded sway over our mental and corporeal faculties and functions; while its slightest deviations from health involve derangements of numerous other organs and structures in the living machine. These peculiarities of the sensorium, its appendages, and its coverings, render an investigation of their disorders so extremely difficult and perplexing, that nothing but the most ardent, unwearied, and systematic course of clinical observation and pathological research can be at all expected to throw light on the obscurity of the subject. Such clinical records and necrologic examinations have not been systematically pursued in this country; for the writings of Dr. Abercrombie and a few others are confessedly sketches, or contributions towards a more regular work on the important class of diseases now under consideration. It is a rare thing, in this country, to see two men uniting to watch and record the phenomena of disease at the bedside, and minutely examine, after death, the corresponding traces of disorganization. Such a process, especially when carried on in a great public hospital, under the eye of the medical officers and visiters, acquires an authenticity of inestimable value, and which places it beyond the humiliating sarcasm of Cullen, who observed—"that there are more false *facts* than false *theories* in medicine."

If Routinism and Apathy should raise their voices—and doubtless they will—against the arduous, or, in their apprehension, fruitless attempt to discriminate the diseases of structures so contiguous as the membranes and substance of the brain, we must not, on that account, be turned from the path of investiga-

tion which Reason, as well as experience of the past, points out as the only one likely to lead us from darkness to light—from doubt to certainty, or at least probability—from empyricism to science. Let it be remembered also, that as it is by minutely studying every *part*, we can hope to become intimately acquainted with the *whole;* so a rigid and careful examination of the disorders affecting each particular tissue enveloping the cerebral mass, must, of necessity, improve our general knowledge of encephalic disease, even when we are unable to determine the precise seat of lesion in the living body. On this account we must entreat the patient attention of our readers to the following analysis, which we trust and hope will amply repay the perusal. The extent of the article must be imputed to the size of the volume, the importance of the subject, and the improbability of any translation of the original into our language taking place.

It may be necessary to state, in limine, that almost all the observations contained in this work were made in the HOTEL DIEU, under the eye of Dr. Recamier, and at the HOSPICE DES ENFANS, under the inspection of Drs. Jadelot and Nysten. The cases were carefully noted at the bedside, and the histories can be verified by the hospital registers. The work itself has been submitted at the INSTITUTE, to the Royal Academy of Sciences, and a very detailed and very favourable report thereon has been drawn up by Portal, Dumeril, Pelletan, Hallè, and Baron Cuvier, concluding with the following sentence:—

"Le travail dont nous venons de donner l'analyse, nous parait pouvoir contribuer à perfectionner la connaissance et le diagnostic, souvent bien difficiles, d'une maladie très-importante à bien caractériser, et par conséquent à assurer le succès de son traitement."

The approbation of such a distinguished body as the INSTITUTE, is a certain passport to public attention; and, without farther preface, we shall proceed to an analysis of the work.

Our authors observe that the diseases to which the cerebral envelopes (dura mater, arachnoid, and pia mater) are subject, may be conveniently classed under the following heads:—1. Congestions. 2. Exhalations, serous or sanguineous. 3. Hæmorrhages. 4. Inflammations. 5. Organic affections, or changes of structure. Where the cerebral pulp itself is affected, "exhalations" must be omitted, and two other heads added—"commotion," and "nervous affections." The present inquiry of our authors is limited to the 4th head, viz. inflammation, and that of the middle envelope, or tunica arachnoides. Their reasons for this preference are, the obscurity in which arachnitis has hitherto been involved—the frequency and danger of the disease

—the difficulty of the diagnosis—and, above all, the light which it throws on other cerebral affections.

1. The first chapter presents a neat, but very succinct sketch of the anatomy and physiology of the arachnoid,* cerebral and spinal. Our readers are aware that it is a delicate transparent membrane, closely in contact with the pia mater, and reflected, according to Bichat and other French anatomists, over the internal surface of the dura mater. Since Bichat's time, it is considered as passing in, to form a lining for all the ventricles of the cerebrum and cerebellum. It is constantly lubricated by a fine rosy exhalation, and is decidedly a *serous* membrane, performing the same functions in the head as the membranes investing the heart, lungs, and abdominal viscera, perform in their respective situations. In a healthy state it is insensible to touch or torture; but, when inflamed, it acquires a high degree of morbid sensibility—a change to which we must attribute the headache, more or less violent, but invariably attendant on arachnitis, forming its special character, and, in this respect, meriting the most profound attention of the practitioner. In its pathological as well as physical character, it harmonizes with the other serous membranes of the body. It is inflamed by the same causes which inflame them—and, like them, frequently throws out aqueous collections, or forms adhesions where the surfaces were before free. Finally, like the pleura and peritoneum, its mode of suppuration is by an effusion of whitish or sero-albuminous fluid, sometimes forming layers of false membrane, &c.

II. The second chapter is on the important subjects of etiology and history of cerebral arachnitis.† Among the primary, most common, and most frequent causes of the disease, are percussions of the head,‡ insolation, organic lesions of the brain itself, apoplectic disposition, depressing passions of a moral nature. Among the secondary causes, in point of frequency or importance, are metastases of different kinds, suppression of habitual discharges, the use of strong drinks, and the common causes of other internal phlegmasiæ, as of pleuritis, gastritis, &c.

* For the sake of brevity, we shall use "*Arachnoid*" as a substantive throughout this article. It is so used by our authors.

† That layer reflected over the cerebrum, as distinguished from that lining the dura mater. Rev.

‡ We this day (26th Oct. 1821) saw a very interesting dissection by Mr. Brodie, of a woman who died of well-marked arachnitis at St. George's Hospital. This was caused also by percussion, and Mr. Brodie pronounced it arachnitis, from the symptoms, and before dissection. There was much coma, and the arachnoid covering the base of the brain was thickened, quite opake, and in some places suppurated. There was scarcely any other lesion of the contents of the cranium besides the inflammation and suppuration of the arachnoid. Rev.

Our authors attach great importance to those percussions or commotions, which, though far too slight to produce fracture of the cranium, are yet capable of injuring the tender structure of the arachnoid. It is curious that this cause determines the suppurative process in the arachnoid more frequently than any other cause. With the exception of two cases, the suppurative process was established in every instance where arachnitis resulted from external violence. To *insolation*, our authors were able distinctly to trace only two cases, probably because their patients were inhabitants of a great city, and little exposed to the direct rays of the sun. Doubtless in the country—and especially in warm countries—this cause is a very frequent one.

Our authors exhibit tabular views of the causes, sexes, ages, duration, periods, &c. of which we can take but a cursory notice. Thus of 116 cases* of arachnitis, 21 were from percussion, two from insolation, two from tubercles of the brain, ten from depressing passions, six from metastasis, one from hydrophobia, three from apoplectic tendency, seventeen from indirect causes, 54 from unknown causes. Of these 116 cases, 78 were suppurated, and 38 not suppurated. In respect to sex, there were 88 cases of arachnitis in males to 28 in females. By the table of ages it appears that 29 were under 14 years of age—44 between the age of 15 and 30 years—38 between 31 and 60 years of age—five between 61 and 80. The ordinary duration of arachnitis is from seven to eighteen days. Death, however, sometimes happens on the third or fourth day, and patients rarely pass the twenty-fifth. Three cases only were protracted to the thirtieth day.

The course of arachnitis presented to our indefatigable and zealous observers three periods sufficiently characterized by their peculiar order of symptoms.

The *first stage*, or period of increment, is marked by an exaltation of the sensibility, whence proceeds cephalalgia, one of the most constant characters of the disease. A tendency to sopor is sometimes manifested, especially when the arachnitis is seated at the base of the brain. The stomach also is sympathetically affected with nausea or vomiting. A febrile movement is generally established in the system, varying according to the age of the subject, the sensibility of the constitution, and the degree of the inflammation. In some rare cases, especially of metastasis, coma sets in from the beginning, and all the symptoms of the third period or stage (described hereafter) commence at once, and are quickly followed by death. The

* Our authors watched a far greater number than this, but have not thought it necessary to detail more than the above number. Rev.

duration of this first stage is usually from a few hours to three or four days.

The *second* stage or period, which is that of reaction, is accompanied with disturbance in the locomotive powers, corresponding with that of the brain itself. It is in this stage that we observe convulsions, delirium, restlessness, oscillations or commencing dilatation of the pupils, and other phenomena of cerebral inflammation. In this stage cephalalgia is less constant than in the first stage, the sensorium appearing less sensible of impressions, as well internal as external. This stage varies in duration, from two, three, or four days, to one or even two weeks. It exhibits some difference in symptoms according to the principal seat of the arachnitis. When the latter is at the base of the brain or in the ventricles, coma is almost essential, and is combined with convulsions, agitation, affection of the eyes, &c. whereas, if the arachnitis be on the convexity of the hemispheres, *delirium* is the early and regular characteristic phenomenon.

The *third* stage is that of the shortest duration, varying from a few hours to three or four days, and rarely passing that period. This is the stage of collapse;—the abolition of sense, loss of motive power, paralysis, local or general, and coma, being the characteristic symptoms. In this stage, however, the features of various cerebral affections are combined, and consequently all distinctions between arachnitis and inflammations of other parts of the brain confounded.

The *collapse*, so characteristic of the third period or stage, and the *excitement* which distinguishes the second, have this peculiarity, that while one part of the body shall present the phenomena of one of these stages, another part shall present those of the other. For example, in the face, we shall often see the muscles of the eyelids paralytic, while those about the mouth are convulsed. It is principally when the arachnitis exists about the base of the brain, near the decussation of the optic nerves, that this medley of symptoms belonging to two different stages is observed.

It is almost needless to say, that a return to health from any of these stages (this is rarely the case from the third) is marked by a diminution of intensity in the symptoms, and a final cessation of them. Our authors confess, at the same time, that it is often difficult to distinguish the transition from one stage into another—especially of the first into the second, and the second into the third. No single symptom can be depended on for this discrimination—the whole must be taken in connexion. Six cases are next detailed by our authors, illustrative of the foregoing observations; one or two of which we shall condense for the use of our readers.

"*Case* 1. *Arachnitis of the Base of the Brain.* A child, five years of age, ricketty from birth, but otherwise pretty healthy, was seized, without any known cause, at 2 o'clock, P. M. with violent vomiting, accompanied with headache, so intense as to cause the child to utter the most piercing cries. This, which was the *first* stage, lasted till midnight, when the child became insensible, uttered sharp cries, and showed convulsive movements in the arms and eyes, with commencing trismus.

"Next day (second day and period of the disease) the child was brought to the hospital in a deplorable condition. The convulsive motions of the upper extremities were frequent, while the lower limbs were rigidly extended. Sensibility was almost abolished, pupils dilated and almost immobile. Four leeches to the sides of the neck —blister to the nape—sinapisms to the feet—æthereal potion (!) 'Infusion de tilleul avec quelques gouttes de liqueur d'Hoffman.' In the evening a purgative lavement. In the course of this day, whether by the efforts of Nature or Art, the convulsions ceased, but the vomitings were renewed twice. The other symptoms remained the same. Towards night all the phenomena assumed an increase of intensity.

"The third day was distinguished by the third stage of the disease. The respiration was now stertorous—the pulse nearly imperceptible —coma profound—gradual extinction of all the functions—death in forty-eight hours from the invasion.

"*Necrotomy.* A portion of arachnoid at the base of the brain, and extending in a triangular form backwards to the cerebellum, was inflamed. The brain itself, under the middle ventricle, of a dark colour from blood (sablé de sang)—all the viscera perfectly sound." P. 29.

Case II. In the *second* case related, the *third* stage supervened on the *first*, without any second stage. A girl eight years of age, was seized on the 15th Sept. 1820, with a slight febrile movement and moderate cephalalgia. On the second day the fever and headache continued. Nothing but the infusion of tilleul (linden tree) administered. On the third day there was, in addition to the other symptoms, some degree of somnolency. The fourth day, in the morning, same state, but quite sensible and rational. In two hours after the visit, she was seized with convulsions of the upper extremities and insensibility. *Evening*, the face red, eyes turned upwards, eyelids wide open, pupils dilated, grinding of the teeth, foaming at the mouth, coma profound, trismus, pulse frequent, respiration laborious, great heat. Leeches, sinapisms, blisters, moderated the convulsions, but did not arrest the progress of the disease. She died on the sixth morning. The other four cases, one of which is from Morgagni, we must pass over.

Mode of Invasion. On the prompt diagnosis of arachnitis all our hope of success in the treatment must depend. The mode

of invasion of arachnitis would be easy of detection were it always to take place in a previously healthy subject, and uncomplicated with other acute or chronic affection. But these complications or superventions are of frequent occurrence, and too often throw the practitioner quite off his guard, at the commencement of this dangerous malady. Our authors attach (and justly too) the greatest importance to a discrimination of the early diagnostic symptoms; and the reader must therefore have patience, if there appears a tedious minuteness, or occasional tautology in the descriptive parts of this treatise. Let him remember the words of the great philosopher—"Nihil est aliud magnum quam multa minuta." Let him also bear in mind that his task of *perusal* is easy, when compared with ours of analysing, translating, and condensing the original.*

"The symptom of the greatest importance, as was before observed, in the invasion of arachnitis, is *cephalalgia*. It is often intense, but varies considerably according to its seat. More than two-thirds of the patients presented this symptom, and probably all would have done so, had they been seen at the very commencement, or had they been capable of giving a faithful account afterwards, when brought to the hospital. Cephalalgia then, occurring suddenly, and especially when violent, should always excite suspicion of arachnitis, whether it takes place in a person previously well, or labouring under some other disease. This suspicion would be strengthened by the occurrence of any disorder of the intellect, the organs of sense, or the locomotive powers. It is necessary, of course, if an external injury be inflicted, to bear in mind that the pain may be from inflammation of the scalp or pericranium; but where there is any doubt about the matter, it is safest to consider the seat of inflammation as internal rather than external of the cranium.

"After cephalalgia, in point of importance, comes disturbance of the intellectual faculties, varying in form, according to the habitudes of the patient. It is never very violent from the beginning. Disturbance of the digestive organs (sympathetically) is particularly conspicuous in the approach of arachnitis—indicated by nausea, or even vomiting, especially after taking any food or drink. Disturbance of the muscular system, at this early period, is a rare occurrence, and is generally *partial*, consisting of convulsive twitchings or motions of the upper extremities or face. When this symptom presents, we may generally conclude, that the period of *invasion* is past, and that arachnitis has been going on for some time unobserved."

* The powers and advantages of the press are prodigious, and only fail to excite our astonishment as well as admiration, by being so familiar to us. A single example, and that of a comparatively insignificant kind, will illustrate this remark:—thus the literary labour of an individual, constructing this article, can be commanded by any person, in the remotest part of Europe, or of the world, for the sum of about as many pence as it cost days or rather nights in compiling! Intellectual labour would bear a very different price were it not for the invention of types.

Lastly, we remark derangement of the organs of sense, such as tinnitus aurium, errors of vision, faintness, vertigo, strabismus, change of features. These last three symptoms are often the only cerebral ones which mark the onset of arachnitis in children, especially when occurring at the base of the brain. On this account, in such subjects we are to examine if there be any attendant pyrexia—(a phenomenon which is little to be relied on in other circumstances)—redness of the conjunctiva, flushing of the cheeks, and other symptoms indicative of cerebral congestion. Coma, in the invasion of arachnitis, is exceedingly rare.

In the beginning of phlogosis of the arachnoid, from an external cause, we may sometimes remark a disposition to rigor, accompanied by a dryness of the wound. But, in general, these rigors are indications that the suppurative process has commenced in the membrane.

More particular Analysis of Symptoms. Impressed with the vast importance of being able to detect, and that at an early period, so dangerous a malady as arachnitis, our authors do not content themselves, as most medical writers do, with a mere *enumeration* of symptoms. They go into a particular analysis of each class, choosing rather to run the risk of being accounted tiresomely minute or tautological, than defective in the history and delineation of the disease which they have undertaken to portray. It is very probable that the reader (especially he who prefers a theoretical discussion to a dry detail of facts) may be somewhat fatigued with the first perusal of these delineations; but when a case occurs (and often will it occur) wherein the life of the patient and the reputation of the practitioner are at stake, he will turn, with trembling anxiety to these pages for assistance, and then he will think us any thing but prolix. The great utility of books, indeed, is useful reference in time of need.

" *Face or Countenance.* Every observant practitioner knows how important it is to study the expression of the countenance in diseases. In arachnitis, besides a general character of surprise and stupor, (etonnement et stupeur) which it is impossible to describe, but which cannot easily be mistaken, after being once seen, the most prominent symptoms are furnished by the eye. The pupils are dilated or contracted, or alternately in each state. The globe of the eye presents a greater or less degree of redness in the conjunctiva—squinting on one or both sides—constant rolling of the organ—its reversion upwards —and finally paralysis of the upper eyelid. In more than a third of all the cases, affection of the pupils was observed. Absolute immobility of pupil does not take place till towards the close of the third stage. Redness of the conjunctiva is very frequent, often amounting to actual ophthalmia. Strabismus occurred in about a tenth of the

cases, and, together with the rotation of the eyes, generally was seen towards the third stage. Turning up of the eyes, and paralysis of the eyelid, was much more frequent than strabismus. They usually occurred towards the end of the second, and in the third stage. Errors of vision are not of much consequence, but morbid sensibility of the retina to light is a striking feature of arachnitis. All the ocular phenomena, however, are more conspicuous when the arachnoid of the base of the brain is affected, than when that of the convexity is inflamed."

The muscular actions of the face are often greatly deranged, and ought to be carefully noticed. Trismus is by no means a very unfrequent attendant on arachnitis, whether suppurated or not. Full a fifth of the cases presented this symptom. It seldom occurs till after the first stage is past. Grinding of the teeth, and foaming at the mouth, are generally seen only among children; and in the second and third stages of the disease. Spasmodic or convulsive movements of the facial muscles are not very frequent, and never seen but in the advanced stages. Generally speaking, the face is coloured and animated in arachnitis—sometimes, however, our authors found it pale and expressionless.

"*Sensitive Apparatus.* This apparatus furnishes symptoms the most frequent of occurrence, the most easy of detection, and the most characteristic of the disease, under the form of disturbance of the intellect, as delirium, somnolency, coma, cephalalgia, stupor;—and, finally, derangement of the general sensibility, and of the senses in particular. Delirium more frequently affects adults, who are most disposed to arachnitis of the convexity of the brain. It is generally of the tranquil kind, or a muttering of half-articulated words between the teeth. The delirium is not usually so intense but that the patient can be roused to answer distinctly at times. These remarks appertain to the first and second stages. In the third, there is generally annihilation of the intellectual faculties. The commencement of delirium may, for the most part, be considered as the sign of transition from the first to the second stage, and forms the most characteristic feature of arachnitis of the convexity of the hemispheres. Where there is no delirium, there is generally either dulness, moroseness, irascibility, or preternatural excitement, and unusual exhilaration. In almost all cases, however, we see a marked diminution of the cerebral faculties, or an impossibility, as it were, of bringing them into action—so much so, that many patients can only be induced to utter monosyllables.

"Somnolency (assoupissement) is one of the most frequent of all the phenomena of arachnitis, having been observed by our authors in 82 out of 116 cases detailed in the volume before us. When arachnitis pursues its ordinary course, this symptom does not appear till the end of the first or beginning of the second stage. In a very few cases our authors observed this somnolency from the very commencement of the disease." 55.

Of *cephalalgia* a good deal has already been said. It is almost inseparable from the first and part of the second stage. It is highly probable that it continues to the last, though not complained of by the patients, who are overwhelmed by the force of the disease, and incapable of distinguishing any particular symptom. They generally characterize the pain as heavy, numb, or shooting—usually occupying the whole, but sometimes only half of the head. The apparent seat of the pain is not always the seat of the disease, as will be shown hereafter.

Stupor, characterized by a kind of self-abandonment, loss of all energy, and countenance of surprise, is common to every stage of the disease, but especially the two first. In a very few cases there has been obstinate pervigilium, instead of somnolency—and in a still fewer, (showing that there is no rule without exception) the patients have preserved the integrity of their intellectual functions till the last.

"The muscular, or locomotive system exhibits various deviations from the healthy state, viz. general or local rigidity, or contraction—local or general palsy—local or general convulsions—to which we may add a third state, that of agitation. This last symptom was observed in about a fifth of the patients, and only in the first and second stages. It is not of much importance as an aid in the diagnosis—but not so *convulsions*. These, with paralysis, are one of the most characteristic signs of arachnitis. General convulsions were observed in one-third of the whole number. They are most common in children; and are principally seen in the second and beginning of the third stage;—more pronounced in the upper than in the lower extremities. Rigid contractions of the muscles are seen (in order of frequency) in those of the lower jaw, posterior of the neck, superior and inferior extremities. They belong to the second stage, and early part of the third—sometimes constant, but generally showing intervals of relaxation. These contractions are not so rigid but that they may be overcome by a steady resistance of the hand of the bystanders. Our authors have several times seen *hemiplegia* suddenly supervene in the course of the first and second stages of arachnitis—generally when the inflammation was caused by external violence." 60.

The disturbances in the *digestive organs* have been sufficiently noticed under the head of invasion of arachnitis; and as to the state of the *vascular system*, pyrexia is so common an attendant on all the phlegmasiæ, that it can give us no aid in the diagnosis of arachnitis. The organs of respiration offer nothing that can much elucidate the diagnosis in question.

The temperature of the skin is generally elevated, and equally diffused over the whole surface of the body, being highest in the second stage of the disease, diminishing and greatly varying towards the termination of the third stage. The skin is

generally dry during the first stage—in the second, sometimes moist, or even covered with an abundant perspiration—especially about the face. The decubitus offers nothing particular. It is the same as in all other diseases affecting profoundly the animal economy—particularly where the brain and its functions are much compromised. The patient lies prostrated, as it were, on his back, deprived of all energy, and every member and part of the body taking position according to the laws of gravitation. This decubitus only applies to the end of the second stage and the whole of the third. Our authors here take notice of a disagreeable odour which patients labouring under this disease, exhale about the end of the second stage, and which they can compare to nothing but the smell of mice. It always proved a very unfavourable symptom.

Mode of Termination. Few, comparatively, recover who exhibit unequivocal symptoms of arachnitis. Nevertheless, in a considerable number of patients who had died of other diseases, and who had previously laboured under inflammation of the arachnoid, our authors found unquestionable traces of this peculiar phlogosis, such as adhesions and thickenings, proving that arachnitis is occasionally susceptible of cure. Farther on will be stated the mode of transition from the acute to the chronic form of the disease—a transition, in the experience of our authors and others, very frequently determining mental alienation. It is obvious that the prognosis in this inflammation is generally most unfavourable. Profound somnolency announces that the patient has but three or four days to live, and nothing but a sensible and progressive diminution of the symptoms ought to induce us to offer a favourable prognosis.

III. *Pathological Anatomy.* The various organic lesions discoverable on dissection of patients who have died of arachnitis are, 1st. a simple blush or redness of the arachnoid membrane. 2d. Thickening, augmented density, and loss of transparency in the said membrane. 3d. A purulent, sero-purulent, or sero-gelatinous exudation on its surface. 4th. The formation of false membranes. 5th. A serous effusion into the ventricles, between the laminæ of the arachnoid, or into the cellular tissue which unites the said membrane to the pia mater.

"The *redness* is generally confined to some spots on the convexity and base of the brain—sometimes, however, extending over a whole hemisphere, and penetrating even into the ventricles; but this last circumstance is very rare. This redness varies from a slight rosy tint to that of the deepest scarlet;—and should be distinguished from simple congestion of that membrane, as well as from injection of the vessels of the pia mater beneath. In the latter cases the membrane

may be raised with a scalpel, and will then appear transparent—not so in the inflammation of the tissue.

"Often, instead of this redness, we find a *thickening* and *opacity* of the membrane. It may then be said that inflammation has disorganized its structure, in the same way that opacity is produced in the transparent cornea by violent ophthalmia. This thickening is seldom general; but distributed in stripes or patches more or less extensive, and always thicker and denser in the middle than at the borders." 70.

Suppuration of the arachnoid is a frequent termination of the disease, and presents some difference of aspect. In most cases the pus is diffused over the surface of the arachnoid, forming a very thin layer, little adherent to the membrane, from which it may be easily scraped with a scalpel, the membrane then appearing thickened, red, and sometimes slightly villous. It is but rare that the pus is found collected in a focus in any considerable quantity. It varies a good deal in colour, nature, and consistence; and sometimes, instead of pus, we find only a serous infiltration into the cells of the arachnoid, resembling much the œdema of the glottis, after acute inflammation of that part. This purulent secretion is most commonly found at the convexity of one or both hemispheres, or else on some points at the base of the brain—particularly about the decussation of the optic nerves, and the tuber annulare. Another kind of effusion is a gelatinous layer, very much resembling the substance found in certain encysted ovarian tumours. On squeezing this layer a liquid is forced out, and a kind of unequal membrane is left between the fingers. This peculiar infiltration is usually found at the base of the brain, near the optics or pons varolii.

"At other times the arachnoid is covered with a complete *false membrane*, similar to that found on the serous tissues in other parts of the body. Its organization was sometimes so far advanced as to exhibit vascularity. These false membranes were more frequently found on the convexity of the cerebrum and cerebellum, than at the base of the brain, or in the ventricles." 72.

Serous Effusion was found in almost every case of arachnitis; but *generally* not exceeding an ounce in quantity—often, however, amounting to three, four, or six ounces. This liquid is *usually* contained in one, or in both of the lateral ventricles—sometimes, however, there is effusion in all four ventricles—and frequently it is dispersed over the whole surface of the arachnoid, which then appears bathed therein. This serosity accumulates at the base of the skull when we remove the brain. It is almost always limpid, occasionally milky, or even flocculent. This serous effusion is particularly apt to occur in arachnitis of the base of the brain, and of the ventricles. It is also

more frequent in children than in adults.* When *adhesions* of the arachnoid present a cellular appearance, it is a proof that the arachnitis is of old standing. These adhesions, in Bichat's experience, degenerate occasionally into bone. Slight granulations on the arachnoid may sometimes be seen, by means of a good light, and appear to be of the same nature as those seen in the pleura and peritoneum after inflammation of those membranes.

IV. *Pathological Physiology.* This division of the work comprises an attempt to trace the connexion of outward signs with inward changes—to examine whether this connexion be subjected to any thing like regular laws, or varies with every idiosyncrasy of constitution, and thus becomes entirely personal or individual. Faithful to their plan, our authors appeal solely to facts, and decline all theory. The only plan of effecting the object of this division is, of course, a careful comparison of symptoms during life, with appearances after death. Of this comparison we now proceed to convey some account to our readers.

"***Dilated pupils*** cannot be considered as proof of effusion into the ventricles, or between the coverings, or at the base of the brain; and for the following reasons:—of 26 cases with dilated pupils, eleven presented effusion into both ventricles—two into one ventricle—four with no dropsy of the ventricles, but effusion on the surface and at the base of the brain—one with effusion on the surface of one hemisphere only—eight without any trace of effusion in any part of the brain." 82.

From this statement it is evident that we cannot place implicit reliance on the phenomenon of dilated pupil in cerebral affections. Indeed, we have been so often disappointed by this symptom, that we have long ceased to attribute much importance to it, unless in connexion with various other phenomena. It certainly is *then* of some consequence.

"*Case* III. Desforges (Mary), aged 38 years, was brought to the Hotel Dieu, on the 15th July, 1818. Only the following short history could be obtained. She had experienced, for a long time, anxiety, malaise, lassitude, disinclination for all kinds of exercise, wandering pains in the limbs and back, constant and severe headache. These symptoms daily augmented; and after the imprudent administration of an emetic, the cephalalgia in particular became so exasperated as to produce delirium, with convulsive movements in the extremities. This state had continued three days, when she was admitted into the hospital, presenting the following symptoms, (on the day of entry she

* Our authors, of course, take care not to confound the effusion of arachnitis, with the dropsical effusions seen in the brains of old people.

had been bled twice,) viz. face pallid, tongue moist, abdomen soft, but painful on pressure, particularly the epigastrium and right iliac region, respiration impeded, stertorous, and more frequent than natural, chest sonorous at all points, pulse slow, full, strong and regular, spasmodic contractions of the upper extremities, subsultus tendinum, eyes watering, conjunctivæ red and injected, *right pupil contracted, left dilated*, both immoveable, squinting (outwards) of both eyes, profound somnolency, constant moaning, eyelids half closed, temperature slightly elevated, covered with cold clammy sweats. Twelve leeches to each side of the neck, and twelve on the abdomen. Died in the night.

"*Dissection.* The whole of the arachnoid covering the upper and lateral surfaces of the hemispheres thickened, opake, and denser than natural. A very thick puriform layer was uniformly diffused between the arachnoid and subjacent pia mater, while the same kind of fluid was infiltrated between the laminæ of the former membrane. There was no effusion into the ventricles, and the arachnoid lining them was healthy. The brain itself and cerebellum were perfectly sound; nor was there any disease in the abdominal or thoracic viscera." 87.

Contraction of the Pupils. There is the same uncertainty attached to this as to dilatation. Nine cases presented this phenomenon in both eyes. In six of them there was serous effusion in both ventricles—while in the other three there was no trace of effusion any where in the brain.

"*Case* IV. Hubert François, 25 years of age, of feeble and delicate constitution, was received into the Hotel Dieu, in the month of March, 1814, for a catarrhal affection, to which much attention was not paid. Three weeks after his entrance, as he continued weak and without appetite, he was put on a course of bark and bitters, which, after two days trial, were laid aside, as restlessness, watching, spasmodic movements, and afterwards a kind of somnolency supervened. These symptoms went on increasing the succeeding day;—and, in the morning following that, there was loss of sensibility, with complete immobility. The pupils were remarkably contracted, especially the left—the breathing was embarrassed—the pulse became feeble, and death closed the scene on that evening.

"*Necrotomy.* Two ounces of limpid serum in the lateral ventricles. The arachnoid covering the whole of the left hemisphere thickened and opake, with an albuminous concretion of more than a line in thickness beneath. In the fossæ occipitales of the left side the arachnoid was evidently inflamed and covered with an albuminous concretion, though less consistent than that on the left hemisphere. The bronchia were somewhat reddened. All the other viscera of the thorax and abdomen were perfectly sound." 92.

Rotation of the Eye. This was only seen in five cases, and in all of these there was suppuration of the arachnoid about the tuber annulare, and in four of the five, effusion also in both ventricles. Although no positive indication can be drawn from

five cases, yet rotation of the eyeballs may fairly be regarded as a dangerous symptom.

Strabismus. This was often found to attend suppuration of the arachnoid, especially about the decussation of the optics; but no dependance can be placed on the phenomenon, except in conjunction with various other symptoms.

Trismus was a symptom occurring in the different lesions attending arachnitis, and therefore not peculiar to any.

Distortion of the mouth is a very frequent symptom of lesions affecting the cerebral pulp itself, as our authors will show in a future work; but in arachnitis it is not to be depended on.

Coma, which, in affections of the brain itself, generally indicates pressure from effusion or extravasation, is far from being a certain indication of such pressure in arachnitis. It was often seen by our authors where there was no effusion or suppuration, but simply inflammation of the arachnoid, especially about the basis cerebri, decussation of the optic nerves and tuber annulare. On the other hand, there has been no coma where the arachnoid has been suppurated, and sero-purulent effusion pressing on the brain. We shall introduce a short case in illustration.

"*Case* V. On the 1st April, 1814, a man, 60 years of age, plethoric, athletic, and of apoplectic constitution, was brought to the Hotel Dieu. He had been three days ill, occasioned by a violent fright, and presented the following symptoms:—face flushed and animated, nictitation of the eyelids, convulsive twitchings of the facial muscles of the lower jaw, and of the lips, confusion of intellect, calling for people absent, reviling those present, believing himself falling into water, over precipices, &c. and using violent exertions to avoid imaginary perils. All the limbs were in constant convulsive motion. This state continued the whole of the day, and he died that night.

"*Dissection.* Under the dura mater was found a kind of clot, formed by a thickening of the arachnoid covering the right hemisphere from infiltration of a sero-purulent fluid. The rest of the arachnoid, and the brain itself perfectly sound, as were all the other viscera." 103.

Cephalalgia. This accompanies all lesions of the arachnoid, and has been amply noticed in the symptomatology.

Delirium. This seems particularly connected with inflammation (previous to suppuration) of the arachnoid covering the convexity of the cerebrum or cerebellum. It is oftener observed

in young people, and in people where there is strong reaction; rarely or never seen in arachnitis of the base of the brain.

Hemiplegia. In eight cases of this affection our authors found effusion on the convexity of the *opposite* hemispheres. This phenomenon was observed principally in arachnitis from external violence.

Convulsions, Spasms, Rigidity. These are generally on the *same side* as the inflammation or effusion; but no certain indication can be drawn from their existence or non existence. In conjunction with other phenomena, they render the prognosis more unfavourable.

Vomiting, as was said before, is a very constant attendant on arachnitis, from the intimate sympathy existing between the brain and stomach; but there is no positive indication to be drawn from this phenomenon, as to the part of the arachnoid affected, or the exact state of the lesion, whether it be inflammation, effusion, or suppuration.

V. *Treatment.* Although arachnitis is a most dangerous and fatal disease; yet there can be no doubt that it may be frequently arrested in its destructive progress by judicious treatment, if taken in the early stage. If once entered on the second stage, recovery will be rare—our French brethren say impossible; but then the comparative inertness of their practice may account for their constant failure after the first stage of the disease is past.

Bleeding. This holds the first rank in the list of remedies, of course. It must be from a large orifice, so that the rapid effusion of blood may induce syncope, or an approach to that state. Our authors have had repeated opportunities of witnessing the good effects of depletion carried to this extent, which dissipated, as by a charm, the most excruciating head-aches, and other phenomena attendant on, or ushering in, arachnitis. They recommend the opening of two veins at once to effect this purpose more speedily and more powerfully. This is a bold step for a French physician, and smacks not a little of that energetic British practice which it is too much the fashion in France to deride as empirical, and designate as Herculean.

In respect to the part from which blood should be taken in preference, our authors are rather undecided. It so happened, they observe, that it was from the arm the majority of the patients were bled, and though venesection, in this way, was often successful; yet, from a few other cases which were more particularly

under their own immediate superintendance, and where the blood was drawn from the lower extremities, they thought the effect was more prompt and decisive in this than in the former mode. It must be exceedingly difficult to draw just comparisons of this kind; and though we by no means hold in contempt the doctrine of revulsion, as is too generally done in the present day, yet we cannot see the superior advantage which is likely to ensue from bleeding in the feet, in cases of cerebral inflammation, especially when we know that in all other inflammations, the nearer the bleeding is to the seat of disease, the better. In inflammation of an internal and vital organ we venture to assert that the venesection which is freest and most readily performed is the best; and, in this respect, brachial has the advantage over tibial or pedal bleeding.

Our authors have not been able to appreciate the effects of temporal arteriotomy or bleeding from the jugular vein, on account of the paucity of such operations, and the *difficulties* (as they state) which attend their performance.

They properly observe that the quantity of blood to be drawn, and the repetitions of blood-letting, must depend on the age and constitution of the patient, together with the intensity of the disease. They are probably right also in asserting that bleeding can be of no service except in the first stage, or in the very first moments of the second. Nevertheless, should symptoms of excitement or plethora occur in later stages of the disease, blood should be abstracted on the principle of euthanasia or lessening the sufferings of the patient, even where we have no hope of averting the fatal issue. We think this advice judicious in almost all other diseases as well as arachnitis, and for another reason that our authors have not given—namely, the *uncertainty* of all medical events, diagnostic and prognostic, and consequently the *chances*, however feeble, that often exist in circumstances apparently the most desperate.

Leeching. Although general bleeding forms the basis of the treatment in this and all other dangerous inflammations, yet local abstractions of blood, especially by leeches, offer very important resources and assistance to the principal measure. This local blood-letting is peculiarly useful in children and in debilitated subjects, especially after general bleeding has been carried as far as we dare venture to go. In arachnitis the places of application are usually the sides of the neck, the temples, the nape, and behind the ears. In the case of young children, four or six leeches behind each ear, will give issue to a sufficient quantity of blood at a time; but to those of ten or twelve years of age, eight or ten leeches may be applied on each side, and so on according as the age advances to manhood.

As in general blood-letting, they think the leeching should be carried to syncope in the early stage of the disease. In all cases where the patient is at all robust, our authors believe the local application of leeches do more harm than good, unless one or two copious general bleedings have preceded them. Our authors have seen the most beneficial effects result from the application of a cluster of leeches to the crown of the head in cases of arachnitis, especially where there was reason to believe, from the symptoms, that the inflammation was on the convexity of the hemispheres. M. Recamier, a physician said to be rich in therapeutical expedients, is in the habit of applying leeches in this way. They have not drawn blood from the scalp by scarifications, and think leeching superior. But cupping the temples, back of the neck, or between the shoulders, they conceive to be a valuable remedy, though too much neglected in France.

Immediately after blood-letting, or even during that operation, the feet and legs should be immersed in warm water, rendered more stimulating by the addition of mustard, salt, or muriatic acid. They should be kept immersed in this fluid half or three quarters of an hour. The bath should be hot enough to redden the skin, and draw the blood forcibly to the lower extremities.

Sinapisms have a still more powerful effect than the pediluvia; but our authors very properly remark that, in many constitutions, they produce a degree of reaction or excitement in the system, which has the effect of increasing rather than diminishing the cerebral congestion or inflammation, especially if copious sanguineous depletion have not preceded. They ought, in general, to be removed as soon as the skin is well reddened, or what is better, our authors think, a piece of fine muslin should be interposed between the sinapism and the skin. This prevents all the mischief, and detracts nothing from the efficacy of the remedy. Our authors condemn the application of sinapisms to the soles of the feet, as preventing the subsequent use of pediluvia. The inside of the legs and the knees are the best places.

Blisters. Of these our authors cannot speak with much confidence or certainty. As they have seen some cases, however, where violent cerebral affections were quickly dissipated by blisters covering the whole of the shaven scalp, they think this measure should be borne in mind as a useful auxiliary in these dangerous cases. At the same time they propose, as a still more energetic and sudden counter-irritant, the ammoniacal pomatum, lately recommended by Dr. Gondret.

Purgatives. Our authors very properly remark that, in a malady so dangerous as arachnitis, there is no part of the body to which we should not, by counter-irritants, endeavour to draw the irritability of the system, so as to prevent its concentration around the part inflamed. On this account, we should not neglect purgatives, whose effects on the intestinal canal are analogous to those produced on the skin by blisters, &c. Our authors seem to forget that another, and perhaps the most important effect of purgatives, is to reduce the quantity of circulating fluids in the body, by the rapid increase of secretion which they produce on the mucous membrane of the primæ viæ, and thus aiding sanguineous depletion in a very powerful manner. They recommend, as purgatives, calomel, rhamnus catharticus, castor oil, or salts, combined occasionally with the drastic resinous purgatives. Desault and Bichat were in the habit of prescribing large doses of antimony or ipecacuan, in glysters, when inflammation supervened on wounds of the head:—and this measure our authors recommend in arachnitis, though their own experience is not sufficient to afford positive data on this point.

Our authors do not mention, and seem not to be aware, that there are certain medicines which, taken internally, exert considerable control over the action of the heart and vascular system, such as digitalis, and tartrite of antimony. In this country these remedies are productive of considerable effect as aids to depletion by the lancet and purgatives.

Local Application of Cold. At the first glance, it might seem that the application of ice and of blisters to the scalp, involved some degree of incongruity. But the object—indeed the effect of blisters is to draw an afflux of blood and sensibility to the exterior of the head, in order to lessen irritation or inflammation of the interior. The object of cold is to constringe the vessels of the head generally, and lessen the sensibility of its membranes, thereby reducing inflammatory excitement or congestion of the brain or its coverings. Our authors think there is no case of arachnitis, in its first and second stages, which forbid the local application of cold. It is agreeable to the feelings of most patients, and often restores them to their senses, when previously delirious, while at the same time it mitigates headache.

Position. This is of great importance in all diseases of the head. The laws of living do not destroy the laws of dead matter, in all cases. Blood will gravitate to the most depending point of the body, before as well as after death; and therefore in inflammatory affections of the brain or its meninges, the head should be kept as high as possible. It is evident also, that

light and noise are to be carefully excluded, in order that no stimulus be directed towards the sensorium through the medium of the nerves of sense.

Compression of the Carotids. In the first volume of our *quarterly* series, p. 498 *et seq.* we gave an account of Dr. Blaud's experiments and observations on compression of the carotid arteries, in cases of sanguineous turgescence of the cerebral vessels. Our authors refer to Dr. Blaud's paper, and quote some of his cases, but have not had experience of the measure themselves.

Trephine. Our authors have heard proposed and seen executed, the perforation of the cranium by the trephine, with the view of arresting the progress of arachnitis! They very properly condemn the measure as much more likely to increase than to remedy the evil.

Affusion of Cold Water. This is a remedy for arachnitis which is little dreamt of by practitioners in general, but from which our authors have seen such decisive good effects, in numerous cases, that they go into very minute details respecting its mode of application, and its modus agendi, convinced of the great importance of the measure in this formidable disease.

The phenomena attendant on the affusion of cold water over the surface of the body, are well known in this country, since the classical exposition of Dr. Currie appeared. But we believe that neither Dr. Currie nor any of his followers contemplated the application of this powerful remedy in cases of topical inflammation, especially of a vital internal organ. But all reasonings and theories must give place to facts, however ingenious or well constructed the former may be. Dr. Recamier has put this remedy to the test of experience on a very large scale at the Hotel Dieu, of which our authors were witnesses, besides employing it in their own practice. They aver that the primary effects of cold water poured on the head and over the body are directly sedative on the surface, and through sympathy, on the brain and nervous system generally. They have repeatedly, indeed always, seen patients delirious from arachnitis, recover their senses *instanter* on affusion being employed —this amelioration of symptoms being of longer or shorter duration according to the intensity of the disease. In the reaction which succeeds the cold affusion, we might naturally expect an exasperation of the topical inflammation; but experience proved it to be otherwise; for as the heat gradually expanded itself from the centre to the circumference of the body of the patient, the restlessness diminished or ceased—the pulse be-

came full but not frequent—the thirst decreased—the intellectual faculties recovered more energy—the functions of the secreting organs were restored—the respiration became free, and a kind of temporary crisis is established. It is at this period that the patient labouring under arachnitis experiences the greatest degree of benefit from the cold affusion.

"Cet ebranlement général, opere sur le systeme nerveux, conjointement avec le dégorgement sanguin des meninges qui resulte de l'application directe du froid sur la tête, peuvent amener et amenent quelquefois, en effet, une revolution favorable, à laquelle beaucoup de malades ont dû leur salut." 145.

This amelioration of the disease resulting from the cold affusion generally lasts several hours, at the end of which time the cerebral phenomena and all the pyrexial symptoms return, sometimes running higher even than before the affusion, but at others, ending in a state favourable to a return of the healthy order of things. If a collapse of the system succeeds, the prognostic is most unfavourable.

Our authors think that the end of the first and beginning of the second stages are the best periods, by far, for the employment of the cold affusion. At these periods the patient has strength enough to produce a sufficient degree of reaction. When the third stage has taken place, the organic changes in the inflamed tissues preclude almost all chance of recovery; and the cold affusion, of course, must be unavailing. Nevertheless, as "*melius anceps quam nullum remedium*," they think in these desperate circumstances the affusion should be tried as a forlorn hope. Our readers will easily perceive, that in all cases where this measure is employed, the rules and precautions laid down by Dr. Currie in its application to fevers, are to be attended to carefully. The mode of administration is also precisely the same as in fevers. Our authors very properly prohibit the cold affusion in cases where arachnitis is complicated with inflammation of the other viscera, but especially the thoracic organs. They conclude this part of the work with some judicious observations on the management of convalescence. As the brain is the organ of thought as well as the centre of sensation, it is essentially necessary to guard the convalescent from all moral emotions of a disagreeable nature.

VI. *Clinical Illustrations.* We now come to the last and most important division of the work, the illustration of principles by numerous cases and dissections. We must not pass over these slightly—at the same time, we shall endeavour to select those instances which convey the most useful lessons, and portray them with all the analytical brevity of which our lan-

guage is capable. We may remark here that our authors have arranged the cases according to the supposed causes producing them, beginning with arachnitis from *external violence*, the most frequent cause of all. We may also observe, en passant, that the present article deserves perusal from the *surgeon* as well as the physician, since injuries of the head form a very important class of accidents, coming particularly under the cognizance of the former. To the general practitioner these cases are, of course, sufficiently interesting, and we hope will be found, in no mean degree, instructive.

Case VI. A bricklayer, 22 years of age, received a contused wound on the left parietal bone by the fall of a mortar trough from a considerable height, which stunned him completely for a short time, when he again recovered his intellectual faculties. He was affected with spontaneous vomiting, and was carried the same day to the HOTEL DIEU, and bled twice on that day. He had also administered nauseating doses of emetic medicine in glysters. All went on well till the *thirteenth* day, when he experienced irregular chills, loss of appetite, and an erysipelatous eruption on the face. This erysipelas ran its course without accident till the 25th day, the wound of the scalp preserving a healthy aspect. On the 26th day, loss of appetite, dryness of the tongue, general uneasiness, diminished suppuration of the wound, some loss of power in the members of the right side betokened no good. These symptoms increased in force during the 27th and 28th day—nights restless—whey for nourishment. 29th. Continual moanings—sensible when spoken to—right arm almost motionless—no discharge from the wound—pulse precipitous.—*Died in the evening.*

"*Dissection.* Pericranium detached from the bone and covered with pus—external table of the bone itself, in the site of the wound, necrosed to the size of a shilling, with a fissure of some inches in length. Corresponding to the wound the arachnoid was inflamed some inches in extent—the lamina reflected over the internal surface of the dura mater being considerably thickened, and adherent to the lamina reflected over the pia mater in such a manner as to form a kind of pouch filled with pus. Every other part of the brain and its coverings sound." 173.

This case shows us that an erysipelatous eruption on the face, after wounds of the head, ought strongly to excite suspicion of internal inflammation. It is evident that the arachnitis did not commence here till the 13th day at the earliest, or rather the 26th day, and that the local nature of the mischief might at last have been remedied, in all probability, by the trephine. When the erysipelas appeared, depletion was not put in force; and when things wore a more alarming appearance, no incision was made to examine the state of the bone. We appeal to our brethren, surgical and physical, whether the medical officers of HOTEL DIEU did not "leave undone those things which they

ought to have done?" We entreat the attention of our surgical brethren to the following case, on account of the eminence of the practitioner under whom it occurred.

"*Case* VII. A man, 30 years of age, was entangled under a pile of falling wood, and was carried, the same day, in a state of insensibility, to the Hotel Dieu, where he was placed under the care of M. Dupuytren. There was a wound, of about an inch in diameter, on the anterior superior part of the left parietal bone, the latter being fractured, and a small portion depressed more than two lines below the level of the rest of the bone. Several incisions were made, and the depressed bone elevated, when the patient immediately became sensible. In the evening of that day there was some cephalalgia, and *eight ounces* (deux palettes) of blood were taken from the arm. The night was good. Next morning there was increase of headache, derangement of ideas, full, strong, and hard pulse. *Emetic whey* was ordered. In the evening the same state continued. *Eight ounces* of blood abstracted. Third day, the ideas incoherent, eyes fixed, face flushed, inclination to throw off the bed clothes. Abstraction of *eight ounces* of blood. Fourth day, incapable of answering questions. At the bottom of the wound the dura mater was seen raised up a little, and covered with pus. Bled from the feet; sinapisms. Temporary diminution of the stupor. In the evening complete insensiblity—respiration difficult—cough—dura mater more tense. A small puncture made in that membrane, which gave issue to a spoonful of reddish serum. Thirty leeches to the temples. In the morning of the fifth day there were some trifling signs of returning sensibility; but all things got worse, and death closed the scene on that evening.

"*Necrotomy.* Besides fracture, there were some fissures running in different directions. A clot of blood, the size of a six franc piece, was found between the bone and dura mater. The whole of the arachnoid covering the hemispheres was thickened, opake, and covered with pus. The pia mater was also infiltrated. A portion of cerebrum corresponding to the depression of bone, was ecchymosed, and altered in its colour. The pleura of the right thoracic cavity was inflamed, covered with false membranes, and a considerable effusion of serum on that side." 179.

Our readers will readily perceive that M. Dupuytren, the first surgeon in France, permitted the ravages of meningeal and cerebral inflammation, *after a fractured cranium*, to proceed three days, while he was taking away the dribbling quantities of *eight ounces* of blood, from a man in the prime of life! On the morning of the *second* day, when he found the headache increasing, the ideas wandering, *the pulse full, hard, and strong* (pouls grand, plein, et dur) only *eight* ounces of blood were taken, and emetic whey prescribed! No purgatives were given throughout the disease, and swarms of leeches were only applied when the patient was nearly moribund. If M. Dupuytren's intention was to check cerebral inflammation, we hesitate not

to assert that the means he took had not the slightest effect in doing so; and that his practice is condemned by the *precepts* which our authors themselves have laid down, though they make no animadversions on this case of most extraordinary misconduct. This case furnishes also an example of the effects resulting from a rule now almost universally followed in France —never to apply the trephine. We believe few English surgeons would have permitted such symptoms to go on after fracture and depression of bone, without trephining. In this instance there is every probability that the trephine would have liberated the clot of blood pressing on the dura mater, and that active depletion and antiphlogistic measures would have checked the meningeal inflammation. These cases of mal-practice are most valuable, as showing very unequivocally the dire effects of half measures, when important organs are inflamed.

Arachnitis from Insolation; related in Pinel's Nosog. Philos.

"*Case* VIII. A man, 40 years of age, much addicted to wine, worked hard during a whole day, at hay-making, under a powerful sun. After a frugal repast he went to bed and slept soundly all night. At daybreak he was found with the following symptoms:—violent headache—prostration of strength—involuntary and profuse lachrymation—redness of the face—incoherence of ideas—memory vacillating—extremities cold. This our authors designate the *first stage*. Second day (second stage also) phrenic delirium—fever. Bled from the feet, antiphlogistic measures. Increase of all the symptoms. *Third day*, convulsions, tremors, death.

"*Dissection.* Inflammation of the dura mater and arachnoid—plexus choroides gorged—slight effusion in the ventricles." 182.

The above is a regular *coup de soleil*, and is not unfrequently seen in the hotter regions of the earth, but is not often so rapid in its march in Europe.

Our authors now proceed from external to internal causes, and first introduce instances of arachnitis from metastasis.

"*Case* IX. A young man, 20 years of age, became affected spontaneously with erysipelas of the face, which exhibited the usual phenomena of that disease. Having exposed himself imprudently to cold, the erysipelas suddenly disappeared, and was succeeded by headache, delirium, great restlessness, and convulsive movements of the limbs. Second day (and *third* stage of the disease) profound coma, convulsions, insensibility, unnatural movements of the lips and eyes. This state continued during the *third* day. On the *fourth* day a flaccid state of the members succeeded to convulsions—the breathing became stertorous—and death closed the scene in the evening.

"*Necrotomy.* The arachnoid covering the superior surface of the cerebral hemispheres, was coated with a false membrane, yellow, opake, and very thick towards the sinciput and sides of the brain. The

arachnoid covering the upper surface of the cerebellum presented the same appearances. There was also a serous infiltration into the cells of the whole arachnoid, particularly of the left side. The pia mater was injected and red." 186.

We shall not multiply instances of arachnoid inflammation from erysipelas of the face, but proceed to occurrences of the kind from various other causes.

Case X. Arachnitis from Suppressed Menstrua.

"Tissot, a married woman, 27 years of age, having travelled more than 300 miles on foot, experienced a sudden fright, on the 6th October, 1816, producing syncope at the moment. The menses, which were flowing copiously, were instantly suppressed, followed by severe headache. On the following day (first stage) there were shiverings, increase of cephalalgia. *Third day*, restlessness, slight delirium. *Fourth day*, very severe pain in the orbital regions—sense of lassitude in the limbs—yellow tongue—frequent pulse. Twenty-five grains of ipecacuan, stimulating pediluvia, barley water and honey. In an hour after the pediluvium, loss of sense, and convulsive movements. Fourth day (second stage of the disease) another accession of loss of sense (perte de connaissance) continuation of the convulsions, particularly of the right side, trismus, irregular action of the eyelids, pupils dilated and insensible to the light, face flushed, breathing difficult. Two large blisters to the thighs; antispasmodic potion, demi-lavement. At ten o'clock convulsive movements of the right side, tendency to paralysis of the left. Fifteen leeches to the pudendum, and the same number to the nape of the neck. *Fifth day*, (third stage of the disease,) coma, incomplete paralysis of the left arm, dilated pupil, strabismus, mouth open, deglutition difficult, flaccidity of the limbs, hiccup, intense heat of the skin, pulse strong, frequent, and resisting. Camphor, cinchona, camphorated glysters. Died next morning.

"*Post-mortem Appearances.* Redness of the whole of the arachnoid covering the convexity of the hemispheres, with a whitish purulent secretion spread over the membrane. There was also considerable accumulation of pus, and thickening of the arachnoid at the base of the brain, especially about the decussation of the optic nerves. The membrane lining the ventricles was sound, and only a small quantity of serosity in one of them. The brain and other viscera were sound." 193.

Our authors here relate a case of arachnitis from the poison of a rabid animal. The symptoms of hydrophobia need not be described; but the dissection exactly corresponds with that of a case which we examined ourselves a few years ago. In both cases the arachnoid was found universally thickened and red—the pia mater gorged with blood and serosity—and much serous effusion at the base of the cranium, and in the vertebral canal. There was also inflammation about the cardiac orifice of the stomach, and in the mucous membrane of the small intestines.

Without pretending to explain the nature of the hydrophobic poison, our authors justly observe that by far the greater number of hydrophobic dissections are in correspondence with the foregoing pathological report, and consequently that cerebral inflammation may be expected as a concomitant, though doubted as a cause of rabies canina. We believe that the methodus medendi—if *medendi* shall ever be applied to hydrophobia—must always hinge upon views of this kind.

Our authors are convinced from experience that arachnitis of the base of the brain, and of the lining of the ventricles, is far more frequent in children (forming, in fact, hydrocephalus acutus) than in adults. We shall therefore introduce here a few cases illustrative of this too common and too fatal disease.

"*Case* XI. Depuis, 3½ years of age, after enjoying good health, was taken, on the 14th July, 1817, with spontaneous vomiting of greenish matters, which continued more or less till the 24th of the same month, accompanied with prostration of strength, a slight degree of drowsiness, and smart paroxysms of fever, without delirium or restlessness. During all this time there was obstinate constipation, and violent headache. The child frequently screamed out, and there were some convulsive movements about the eyes. The intellect did not seem disturbed. He was transported to the Hospital des Enfans, on this day, the 11th of the disease, and the following symptoms were noted. The child lay on his back, the trunk immobile, head turned backwards, eyelids heavy and closed, pupils little dilated, features altered, eyes turned upwards. The child was sensible when spoken to, and complained of great pain in the occipital region—drowsiness constant, pulse feeble, irregular, and frequent—respiration slow, unequal, and apparently difficult—tongue coated yellow—constipation. Mustard pediluvia—lavements—lemonade—nitric ether mixture. In two hours some convulsive movements—screamings—complaints of violent pain in the back of the head, to which part the child was constantly applying its hand. Twelfth day, (second in hospital,) piercing cries during the whole night—strabismus—features greatly altered. Lemonade, with a grain of emetic tartar—lavements—mustard pediluvia—blister to the nape of the neck and behind the ears—ice to the head. In two hours a strong paroxysm—much crying during the day—loss of intellectual and sentient faculties. *Thirteenth day*, a general remission of all the symptoms—pulse very irregular—great irritability of temper. Same treatment. *Fourteenth day*, (third stage of the disease,) pupils dilated and immoveable—profound somnolency—pulse irregular, feeble, small, and extremely quick—eyes prominent, affected with strabismus, and half open—head inclining to any position which the laws of gravity dictated—the intellect not much affected. Blisters to the vertebral column. *Fifteenth day*, same state, but the intellect more disturbed. *Sixteenth day*, profound coma—gradual extinction of the vital and natural functions—death.

"*Dissection.* Arachnoid inflammation at the base of the brain about

the decussation of the optic nerves, and over the tuber annulare—the membrane itself covered, in many places, with an albuminous exudation, penetrating into the fissura magna Sylvii. Eight ounces of serous effusion in the ventricles. No other morbid appearance in any part of the body." 237.

We need hardly remark that the *treatment* in this case was admirably adapted to show the genuine and unsophisticated ravages of disease. Our medicina *perturbatrix* in this country gives us few opportunities, comparatively, of observing these undisturbed morbid processes in perfection. On this account continental pathology is a very valuable article of importation into English medicine. The following case offers a good illustration of what Dr. Golis has denominated the "water-stroke," by the suddenness of the effusion.

"*Case* XII. Petit, 6 years of age, entered the HOSPITAL DES ENFANS on the 18th March, 1816, without any symptoms of illness. During the 19th also, the child appeared well. On the 20th, in the morning, our authors found him in strong convulsions—tetanic—constant tendency to bend backwards—loss of sense—dilated pupils—difficult deglutition—tension and tenderness of the abdomen—constipation—slow, small, irregular pulse—breathing scarce perceptible—in short, the child was in the *third stage* of arachnitis. 21st. General amelioration—incomplete return of sensibility, but continuation of the tetanic rigidity. Sinapisms to the legs—blisters behind the ears—camphorated medicines—ice to the head. 22d. Little or no change. The child was revived a little by the ice, but soon relapsed into a state of torpor. Same treatment—two leeches to each side of the neck. 23d. Coma regularly established—cerebral congestion well marked—face red—frontal veins swelled—eyes fixed, and turned upwards—considerable rigidity of the limbs—frequent irregular pulse—burning skin—difficult breathing—death in the midst of convulsions.

"*Dissection.* Very well marked inflammation of that portion of arachnoid situated between the tuber annulare and the decussation of the optic nerves, in which place the membrane was thickened, and covered with an albuminous concretion. Eight ounces of serous effusion in the ventricles." 238.

We must pass over some hundreds of pages, containing cases and dissections without number, in illustration of every variety and shade of arachnoid inflammation. What we have quoted will, we hope, be sufficient to convey a plain practical view of the attendant phenomena of this dangerous affection. We need hardly wonder that arachnitis should be very generally fatal under the French mode of treatment; yet even *they* have brought forward several unquestionable proofs that the disease is susceptible of cure in many instances, especially when treated with any thing like decision. In this country, we see examples of cerebral inflammation every day subdued by active depletion;

and we hope the pathological facts which we have, in this article, laid before our junior brethren, will induce them to pay increased attention to the phenomena attendant on, and indicative of, so destructive and terrible a malady. The following case is a very interesting and satisfactory one.

"*Case* XIII. A man, 45 years of age, of sanguineous temperament, and excellent constitution, and who had served eighteen years in the cavalry, was seized, after a forced march which caused him to perspire freely, with cold chills, head-ache, fever, general uneasiness, (malaise,) tightness of the chest. No medical treatment was employed, and, of course, the man got worse, and at the end of ten days from the invasion, he entered the Hotel Dieu, presenting the following symptoms:—face coloured—conjunctiva injected—pupils immoveable—headache—delirium for a few hours past, yet capable of answering correctly when roused—pulse full and quick—skin hot and dry—abdomen painful—respiration impeded—expectoration of a reddish tinge. Sixteen ounces of blood from the arm—leeches to the nape of the neck, to the abdomen, and to the anus. The thoracic and abdominal symptoms subsided, but the cerebral ones lost nothing of their intensity. The bleeding and leeching were reiterated. The patient remained a few hours in the same state. Blisters were then applied to the legs, and the symptoms were greatly mitigated for four or five days, at the expiration of which the fever and delirium returned, without any other particular symptom. Leeches were again applied to the neck, and blisters to the thighs, which again subdued the fever and cerebral symptoms. The patient passed a fortnight in a tranquil state, but the appetite and strength did not return to their natural range. A diarrhœa now came on, with cough and fever, against which various remedies were unavailing. The strength daily declined, but there was no head-ache, nor intellectual disorder of any kind. It was ascertained by the stethoscope, rather than by the respiration or cough, that organic disease existed in the left side of the chest. The diarrhœa continued, and the patient died at the end of six weeks from the commencement of his complaint.

"*Dissection.* The arachnoid covering both hemispheres was thickened and opake, forming a kind of cap for the brain. The arachnoid of the base of the brain was healthy. There was very little serosity in the ventricles or in any part of the head. The right lung was healthy, but the left was so studded with tubercles that scarce a vestige of its natural organization could be found. There was nothing remarkable in any other part of the body." 519.

We think the above case offers very good evidence that arachnitis had taken place, but that the patient's death was not thereby occasioned. Whether, if the patient had not died of other disease, the thickening and opacity of the arachnoid would have been removed by the powers of Nature, is a question that we cannot answer in our present state of knowledge.

Twelve or fifteen successful cases are detailed by our authors, among which there are several where the cold affusion was em-

ployed as an auxiliary to bleeding, and apparently with very good effects. Our limits prevent us from noticing any of these cases, as we are anxious to dedicate a few pages to the following important subject.

VII. *Inflammation of the Spinal Arachnoid.* Our authors neither advocate nor condemn the theories which have, of late years, attributed tetanus, hydrophobia, and certain spasmodic affections to arachnoid inflammation. They wisely and modestly adhere to facts, and ground no opinions upon any other basis.

By a singular and unfortunate concourse of circumstances, it has not occurred to our authors to see a single case of *spinal* arachnitis, unaccompanied by inflammation, more or less, of the arachnoid of the brain. This might seem a formidable embarrassment in the way of establishing a diagnosis between spinal and cerebral arachnitis; but if we find that, in the complications of the two diseases, there were always some peculiar additional symptoms to those where the cerebral arachnoid *only* was inflamed, we may reasonably attribute these additional phenomena to the spinal affection. Several friends, too, of our authors, on whom they could rely with confidence, have met with cases of pure and uncomplicated spinal arachnitis, the symptoms of which perfectly corresponded with those which our authors have traced in the more complicated cases, as appertaining to the disease under consideration.

The most remarkable feature in spinal arachnitis is *contraction of the muscles on the posterior part of the trunk*—a contraction varying from a simple rigidity to the most violent opisthotonos, such as we meet with in tetanus. This muscular contraction must not be confounded with that, which not unfrequently appears in cerebral arachnitis, especially when the inflammation is situated about the base of the brain, and consists in a throwing back of the head, and cervical portion of the spine, while the remainder of the column continues in its natural position. In spinal arachnitis, on the other hand, the whole vertebral column is formed into a kind of inflexible arch, such as our authors never observed in simple inflammation of the cerebral arachnoid.

Next, in order of diagnostic importance to this opisthotonic contraction, is *pain* in some part of the back, varying in seat and degree, but generally most severe in the part corresponding to the site of the inflammation. It also shows remissions, and occasionally complete intermissions. In a very few cases, where cerebral arachnitis was complicated with spinal, the patients did not complain much of pain in the back; but then they were labouring under severe cephalalgia, and our authors very

truly remark that violent pain in one organ or part of the body, will often mask affections of other organs or parts; or so absorb the patient's attention as to render him inattentive to any other sensation.

The arching backwards of the spinal column, then, and pain in the back, are the only diagnostic symptoms on which our authors place any reliance. In one patient only they remarked violent pain in the lower extremities. The treatment of this disease must consist in general and local bleeding, and counter-irritants—but it has been very generally fatal in the hands of our continental brethren. We shall now proceed to lay before our readers a selection of such cases as appear to us best calculated to make useful impressions on the practitioner's mind.

"*Case* XIV. Leger, a terrace maker, 28 years of age, of athletic form and strong constitution, had been exposed to great fatigues and bad weather, in demolishing the castle of St. Ouen, near Paris. On the first or second day of December, 1816, he was wounded on the anterior and inner side of the right foot by a nail, which he extracted, and then continued his work. On the 7th December he felt pains in his back. On the 10th he felt an unusual degree of lassitude, while a slight trismus prevented the free exercise of mastication. On the 12th there was some difficulty experienced in bending the spine; yet still Leger persevered in his daily labours, and even enjoyed some sleep by night. On the 13th, however, Leger found himself unable to walk, and therefore took to his bed, experiencing the most acute pains in his back. In the night the stiffness of the trunk and the trismus increased—the pains in the back and neck were so excruciating as to force the patient to cry aloud. On the 14th at noon he was conveyed to the Hotel Dieu, the vertebral column bent into an arch backwards—the jaws incapable of extension to more than half an inch—sense of great constriction in the chest. The original wound in the foot was incised, and some ichorous pus discharged—then a poultice applied. He was bled from the arm—had six grains of opium administered—and was put into the warm bath. A general perspiration ensued, but the pains were exasperated. Laudanum and assafœtida glysters were thrown up—a warm bath, of two hours, produced temporary mitigation of the symptoms. The 15th presented all the phenomena of tetanus, in the form of opisthotonos and trismus, and death closed the scene at two o'clock, P. M.

"*Dissection.* The arachnoid covering the upper portions of the cerebral hemispheres presented red patches irregularly circumscribed. At the basis cerebri the arachnoid was sound, and very little serosity was found in the ventricles. The membranes enveloping the spinal marrow were uniformly, and throughout their whole extent and substance, of an extremely vivid red colour. The same appearances were observable in the internal tunics of the cavities of the heart, and of all the large vessels, veins, and arteries. The whole of the blood was fluid in the vessels. All the other organs in the body were sound. The original wound was examined, and the filaments of the

plantar nerves traced as far as possible, but without discovering any lesion of structure whatever."

The above case we consider to be one of traumatic tetanus, and in the few dissections which we have made of tetanic patients, we have always found inflammatory traces in the membranes either of the brain or spine. Whether the inflammation in the internal tunics of the heart and vessels were mere coincidences in this case, or had any connexion with the tetanic symptoms, we cannot presume to determine. It may be remarked that, in this case, the cerebral arachnitis was not accompanied by its usual phenomena—a circumstance that may be reasonably accounted for by the intensity of the spinal disease, and the great sufferings of the patient.

"*Case* XV. S. André, 14 years of age, caught a severe cold by having his hair cut too close. Fifteen days after the commencement of the catarrh, he was seized with violent cephalalgia, accompanied with dull pains in the limbs and soles of the feet. His appetite continued good, and these symptoms were dissipated by rest and diluent drinks. After a fit of indigestion, however, the headache returned, in as much violence as ever, with intense redness of the face, considerable fever, perspirations, quick and precipitous breathing. In this state he continued three days, without medical assistance, and on the 4th day was brought to our authors, exhibiting the following phenomena:—The patient lay on his back, the head forcibly carried backwards and to the left side—the spine arched rigidly, and forming complete opisthotonos—face red, and countenance expressive of great suffering—eyes half open, and the patient not taking notice unless strongly excited—conjunctivæ injected—pupils dilated, especially the right one, but still contractile to the light—great stupor—when roused, with difficulty, from this stupor, he complained of violent occipital cephalalgia, buzzing in the ears, and ocular spectra. He recognised his parents for a few minutes and then fell into a state of reverie and stupor. The lower extremities and left arm were flaccid and even paralytic—the breathing excessively quick and difficult, 41 in the minute—action of the heart strong and regular, but not at all corresponding with the pulse, which was small, vibrating, and 120 in the minute. In the evening there was exacerbation of all the symptoms, with complete loss of sense. *Fifth day*, stupor still more profound—opisthotonos continues—complete paralysis of the left arm, rigidity of the right—pupils dilated and immoveable. In short, all the symptoms became aggravated, and death supervened in the evening.

"*Dissection.* Inflammation of that portion of arachnoid situated at the base of the brain, where it was thickened, especially on the tuber annulare, and infiltrated with serum. The arachnoid covering the anterior of the hemispheres presented some patches of inflammation, the ventricles containing two ounces of serum. The vertebral canal being opened completely, and the dura mater slit up, the latter membrane presented a uniform redness throughout its whole extent,

the arachnoid covering the spinal marrow being highly inflamed for the space of six or seven inches—the inflamed portion being at a good distance from the head, and covered with a coriaceous exudation. The canal itself contained a quantity of reddish serosity. There were some tubercles in the lungs, and an inflamed portion of peritoneum over the liver." 563.

Our authors consider, and we think justly so, that the opisthotonos was clearly attributable to the spinal arachnitis, especially as there was a considerable space of sound arachnoid intervening between that portion inflamed within the cranium and that within the vertebral canal.

"*Case* XVI. Mary ———, 28 years of age, was violently agitated by an insulting proposal made to her at a time when the menstrual discharge was flowing. The catamenia were suddenly suppressed, and the woman became affected with cold chills for twenty-four hours, succeeded by heat of surface, ardent thirst, and globus hystericus. On the third day, bilious vomiting. On the fourth, the vomitings and hysterical symptoms subsided, and she was received into La Charite, presenting the following phenomena:—*fifth day*, face flushed—eyes brilliant and sparkling—neck tumefied—head thrown backwards—constant pain along the whole line of the vertebral canal, exasperated by the slightest motion, (not by pressure,) so as to cause the patient to cry aloud—breathing confined and panting—pulse sharp and quick—skin hot and dry—no stool for four days. Fifteen leeches to the anus—purgative lavement—mustard pediluvia—frictions with liniments to the spine. *Sixth day*, diminution of the symptoms. Blisters to the nape of the neck, and 24 leeches behind the ears. *Seventh day*, some disturbed sleep. The sensibility of the head and back exalted—tetanic rigidity of the neck and spine great—respiration more distressing than ever—face pale and expressive of great suffering. Venesection from the arm, blister to the sacrum, sinapisms, lavements, &c. In three minutes after it was drawn the blood was covered with a thick buff, and strongly cupped. In an hour the patient felt better. The bleeding was therefore reiterated. *Eighth day*, the amelioration continued. Another venesection. *Ninth day*, the blood was buffed and cupped as much as ever; yet the patient is not so well to-day. The pain in the head and back is more acute—the features are shrunk, and much altered. Forty-eight leeches were placed as a cordon along the spine on both sides of the vertebræ. These measures produced no relief, and the patient died next day at noon.

"*Dissection.* The vertebral canal being opened, and the dura mater incised, a layer of whitish, opake, and membrane-form materials, was found covering the whole spinal marrow, from the occipital hole to the sacrum. On pressing this sheath a fluid was made to flow back into the cranium. On scraping it with a scalpel nothing was separated from it, it was so firm and polished. The arachnoid and pia mater were very much injected, particularly in the fissura magna Sylvii. In the right side there was an albuminous concretion, similar to the albuminous layer in the vertebral canal. Similar concretions

were found on the external surface of the right hemisphere, under the tentorium cerebelli, and between the cerebellum and basis cranii. The lateral and third ventricles were greatly distended with a lactescent fluid. Organs of chest and abdomen perfectly sound." 568.

The above is certainly a well marked case, and showed the characteristic symptoms of spinal arachnitis (pain in the back and opisthotonos) in the clearest manner. The woman was confided at LA CHARITE to the care of M. L'Herminier, and our authors consider the mode of treatment as a perfect model (un veritable modèle) for others to follow. Now we are of a different opinion. On the fifth day, when received into the hospital, with all the symptoms of the most terrible excitement in the system, M. L'Herminier contented himself with applying fifteen leeches to the anus, and exhibiting a lavement! Where is the bleeding to syncope recommended by our authors themselves? The patient was not bled till the 7th day, and then the blood showed the most decisive marks of inflammation, the symptoms being much mitigated by the bleeding. But it is needless to criticise the treatment employed by our continental neighbours in acute diseases. It is perfectly incomprehensible! How our authors too, in the face of their own instructions, could think of recommending M. L'Herminier's case as a model of active treatment, we are at a loss to conceive.

The cases which press upon our notice in this division of the work, are so very important and interesting, that we entreat the most serious attention of our readers to them, nor do we deem it necessary to make any apology for extending this article by the introduction of such valuable materials—materials which must otherwise be almost entirely lost to the British public.

"*Case* XVII. Cotier, a soldier in the 32d regiment, had been cured of itch at the St. Louis Hospital, but not yet discharged. On the 8th May, 1814, after a debauch in vinous and spirituous liquors, he fell asleep in an open court, where he lay several hours exposed to the sunbeams. In the evening he was carried into his ward, and his companions reported that he passed a very restless night, often starting out of his bed, and uttering piercing cries. Next morning he presented the following phenomena:—General cephalalgia, intolerance of light and noise, red and dry tongue, nausea, difficult deglutition, tenderness on pressure of the epigastrium, respiration laborious, pulse small and quick, marked stiffness in the neck and trunk. A vein was opened in the arm, and another in the foot; but they furnished very little blood. Towards evening, somnolency when the patient was left quiet, but great agitation when touched. Efforts to get out of bed—piercing cries—convulsions of the facial muscles—confusion of intellect, and extreme difficulty in answering questions. A dozen of leeches to the neck. *Third day*, face flushed—eyes fixed—pupils dilated and immoveable—conjunctivæ injected—involuntary lachrymation—contraction and rigidity of the extensor muscles of the

neck and spine, forming opisthotonos—inability to speak—diarrhœa—involuntary discharge of urine. Twelve leeches to the anus, blisters to the legs. *Fourth day*, tetanic symptoms augmented—subsultus tendinum—pupils still dilated and insensible to the most vivid light—erysipelatous edema of the left side of the face—breathing short and embarrassed—pulse intermitting. Died at three P. M.

"*Dissection.* Vessels of the dura mater gorged with black and coagulated blood—arachnoid membrane almost universally inflamed, being red, thickened, injected, and covered with a sero-purulent exudation, in considerable quantity. The medullary substance of the brain was of a reddish hue, and presented innumerable bloody points when sliced. The ventricles contained between six and seven ounces of watery fluid. On laying open the spinal canal, the same marks of this terrible phlegmasia were evident. The spinal arachnoid was inflamed and thickened throughout its whole extent, and a sero-purulent exudation pervaded all parts of the canal." 571.

In the above case, it will be observed, that the pain along the vertebral canal was not complained of, as in most of the cases already detailed. This may be accounted for, however, by the intense state of disease in the brain, and the consequent derangement of intellect. Indeed, it may be very generally observed, that intense cephalalgia, when it exists, absorbs greatly the attention of the patient, who often neglects to mention other pains, unless closely questioned. This ought to be borne in mind.

We shall introduce but one more case, and that principally with the object of admonishing some of our brethren, who would appear to view the vascular system as the grand agent in all maladies, to the almost exclusion of the nerves. We shall perceive, in the following case, several of the characteristics of spinal arachnitis, terminating in death, and yet without presenting a particle of inflammation in head or spine. We shall make some farther reflections after the case is stated.

"*Case* XVIII. A woman, of the name of Roux, 62 years of age, and enjoying habitual good health, experienced a fall, in the middle of April, 1817, which, according to her own account, gave the spinal column and head such a shock as deprived her of sense for a few minutes. From this time till the 29th August following, the occipital region and vertebral column were the seats of constant pain. On the last mentioned day she experienced contractions in the arms, especially the right arm, with great stiffness and rigidity in the neck and trunk—difficult deglutition—pain in the throat, occipital region, and spinal column—tenderness and tension of the abdomen—contraction of the left pupil. The intellectual functions were free; but the tongue was dry and red, with heat of skin, bitter taste in the mouth, and inclination to vomit. The pulse was quick, but void of force. Venesection, warm bath, purgative enema, sulphate of soda in her drink, great restlessness during the night, with pain in the limbs, but no de-

lirium. *Fourth day of these symptoms,* trismus complete—increased rigidity of the left arm—other symptoms the same. Trifling remedies. *Fifth and sixth days,* nearly the same; the tetanic symptoms continued, but the intellects were clear to the last moment. Forty leeches were applied to the spine, but the patient died next day, being the seventh from the commencement of the tetanic symptoms.

"*Dissection* showed the brain and its membranes, the spinal marrow and its coverings, in the most perfect state of integrity, with the exception of a very small quantity of serum in the vertebral canal, and a few varicose vessels near the cauda equina. Every other organ in the body was examined without finding any sign of lesion." 593.

We may observe, on the above case, that the preservation of the intellectual faculties throughout the whole course of the disease was a strong evidence against arachnoid inflammation in the head; but there were most, if not all, the symptoms which accompanied *spinal* arachnitis in numerous other cases. What are we to infer from this? Why, that the ridiculed state called *irritation* of the nervous system will sometimes imitate *inflammation*, and go on to the destruction of life, without leaving a single trace of organic lesion after death. This may teach our younger brethren what a part the nervous system is capable of playing occasionally in the animal economy. At the same time we would be very sorry to advise the practitioner to lean much on the chance of having these nervous irritations to deal with, when the symptoms are equivocal, and there are any reasons to suspect inflammation. In the first place, where the proper phenomena or signs of phlogosis are present, there will be actual inflammation in three cases out of four. In the second place, the mischief arising from treating a neurosis as an inflammation is nothing compared with that which must result from treating a phlegmasia as an irritation or nervous affection. Finally, as we are convinced that nervous irritation is the cousin-german, if not the frequent parent of inflammation, we think it by far the safest practice, in all doubtful cases, to combine the depletive mode of treatment with that which may have a soothing or sedative effect on the nervous system.

We have now brought the analysis of this important work to a close, after expending on it no inconsiderable portion of time and labour. We may again repeat it as our conviction, that the authors of the work before us have taken the only proper mode of investigating a most important class of diseases; and that, although they may not empower us to always distinguish the precise seat of disorder within the head or spine, yet that they will often assist the inexperienced practitioner, and enable him to ascertain, with very considerable probability, not to say accuracy, whether or not he has inflammation of the brain or

spine to contend with—a point of knowledge, in the determining of which, the life of his patient and possibly his own reputation may be involved.

We shall take an early opportunity of introducing to the English reader an account of those pathological researches on the diseases affecting the *medullary* substance of the brain, now publishing on the continent, and part of which are already in our possession. In the mean time we entreat the earnest attention of our junior brethren to what we have here presented them.

Additions à l'Anatomie Générale de Xavier Bichat, pour servir de complément aux Editions en quatre volumes. Par P. A. Beclard, Professeur d'Anatomie, et de Physiologie à la Faculté de Médecine de Paris, &c. A Paris, chez J. A. Brosson et J. S. Chaudé, Libraires, Rue Pierre-Sarrazin, No. 9. Septembre, 1821.

(From the Edinburgh Medical and Surgical Journal, for April, 1822.)

The numerous and varied objects of the material world may be referred to two great divisions; they are either living, or inanimate—they are organized, or they are inorganic—they are characterized by vital, or by physical properties. When the individuals of these two general divisions of material substances are made the subject of examination by the human faculties, they give rise to the creation of several distinct branches of knowledge; which, although in some points approaching each other, are, however, in their general characters, so remote and different, that they have in modern times been arranged by themselves, and appropriated to different labourers in the field of science. All inanimate and inorganic matter is characterized by physical properties—is under the influence of physical laws; and the information which is daily acquired and communicated concerning them, constitutes the several divisions of the physical sciences. Every thing, on the contrary, which lives and is organic, possesses not merely physical, but vital properties,—is under the influence, not of physical, but of physiological laws; and the branches of human knowledge in which their phenomena are investigated and explained, form what may be named the physiological sciences; the principal object of which, according to the most correct and enlightened views, is to ascertain the structure, properties, and functions of living beings. In a more detailed sense, the study of the world of organic and living bodies comprehends two great objects—the knowledge of structure and functions; and all that is, or can be known, of such beings, whether animal or vegetable, may be referred to these two ge-

neral heads, under the technical names of Anatomy and Physiology.

The former of these sciences may be considered as of two different kinds; in the one of which the animal body is examined, as it consists of different organic substances; while, in the other, the situation, figure, and volume of the several organs and members, form the chief subject of inquiry. Every animal body consists of many organs, and each organ is composed of various kinds of substance, which are in many respects widely different from each other; the artery differs from the vein, the muscle from its tendon, the tendon from the ligament, and the nerve from all. Those structures even, the mechanical form and distribution of which are the same, are nevertheless unlike in their intimate organization. The serous membranes differ from the mucous and fibrous, and have scarcely two common properties. Yet as these various and unlike substances are employed in the formation of animal bodies, it is requisite, in order to have a correct and complete idea of the animal structure, to study separately these tissues, as they have been named, and to ascertain the proportions in which they are present in the various organs of the body. As in the chemical composition of organic bodies, we have proximate chemical principles; so the anatomical knowledge of the same bodies suggests a species of analysis, in which the body is separated into proximate principles of an anatomical character, and in which these constituent or elementary tissues are examined and arranged by genera and species. The knowledge which is obtained in this manner, constitutes what has been named General Anatomy; and although the necessity of it to a just view of the animal organization is obvious enough, yet it is almost entirely a modern and recent department of anatomical science.

The degree of abstraction and generalization which a good system of general anatomy implies, is an ultimate result of the minute knowledge of detailed and local anatomy; and we accordingly find, that all the views given by the ancients are vague, hypothetical, and imperfect. We perceive, indeed, in the works of Haller, Bordeu, and some other physiologists, various attempts at simplification, and reference of the animal tissues to a fibre or fibres, which, after the manner of the ancients, they imagined to be the fundamental or elementary tissue; but this was rather a hypothetical fiction—a violent generalization—than any approach to the sober and patient review and comparison of the various kinds of substance which enter into the composition of an animal body. So much fictitious anatomy, in short, and so much mystical physiology, was the genuine offspring of this speculation, that the most wonderful part of its history was unquestionably the importance of the names

by which it was so long sanctioned; and the considerable progress which the medical sciences, and especially rational pathology, have recently made, is mainly to be ascribed to its explosion, and the adoption of a more palpable and obvious course of inquiry. The progressive improvement of this division of medical science may afford at once the twofold feeling of pride and humiliation to every one whose patriotism makes him delight in the literary glory and reputation of his country. Although British physicians and pathologists first gave these rational views of the structure of the living body,—though the names of Cullen, Hunter, and Carmichael Smith will appear in medical history as in some respect the founders of a new era in anatomical physiology,—yet the love of the useful, and the disregard for every thing not immediately applicable to practice, for which our countrymen have been peculiarly distinguished, have obviously prevented them from sharing in the honour and credit of founding a complete and magnificent system. It has been often remarked, that science is cultivated by the English rather for the actual advantages which it confers, than for any charms which it may be supposed to possess; and that they have been most assiduously devoted to those branches of philosophy which were susceptible of application to the business of life, and which thus improved the condition of the human race. How far this may be correct as a general assertion, we do not propose at present to inquire; but truth compels us to admit, that the analytical anatomy of the organic animal elements was suggested in this country by the variations in the phenomena of disease, as they incidentally occurred in different situations of the human body; and the partial and limited views which were in this manner implied, rather than taken, form but a small and inconsiderable portion of the task which was conceived and executed by Bichat. Mr. John Hunter, whose talent for analytical observation can never be too highly appreciated, was perhaps the first author who, in this country, decidedly rejected the easy and simple views which the more ancient pathologists delivered of the animal organization. His more devoted admirers may perhaps say, that he was the only author who did so; but, as it is difficult to determine how much he had borrowed from the views and opinions of his brother, and as it is certain that the analytical anatomy of the human body had not entirely escaped Dr. William Hunter and Dr. Cullen, we cannot justly admit that Mr. Hunter did much more than explode the simplifying doctrines of the ancients, and open the field for more rational and natural principles. A pardonable, but mistaken zeal, has influenced not a few to rest more decided and positive claims on the character of Dr. Carmichael Smith, who certainly made an addition of some importance to

general anatomy, in his observations on the inflammatory action, as it is modified by difference of tissue.* Of these pathologists, it would be unjust not to admit the merit, and unpatriotic not to feel proud; but we do not agree with those who think, that, because Mr. Hunter and Dr. Smith did something, they therefore accomplished all that was requisite; nor do we believe, that the comparative obscurity into which their labours have, in the natural progress of science, descended, ought to be viewed as the effect either of ingratitude or insensibility to their talents. Notwithstanding all that has been observed and thought by Mr. Hunter, and all that Dr. C. Smith has taught, the sole merit of framing and executing a great general plan, of collecting and arranging the isolated information of several different inquirers, and ascertaining many new points himself, belongs undoubtedly to Bichat. We see no reason for agreeing with those who deem this author chargeable with ingratitude and plagiarism, because he has not acknowledged, at every page, either the information which he derived from Mr Hunter, or the subjects of which he had merely hints, and which he personally enlarged and verified. The peculiar merit of Bichat consists, not in these petty or minute matters, but in the conception of an extensive view of the animal structure, in the arrangement of the whole, and in the selection and completion of its details. The scattered information of previous authors was of comparatively little or no value, till concentrated and directed by his master hand; and the character of his work is founded not merely on the individual details, but, in a particular manner, on the general effect which is produced by the whole.

The most satisfactory proof, perhaps, which can be adduced of the superior excellence of Bichat's system of general anatomy, is the sovereign influence which the principles developed in it have since exercised on the progress of most of the medical sciences, but, above all, pathology, and practical medicine. We do not wish to favour the blind and devoted attachment with which most of his countrymen seem to have regarded his talents and character; nor would it be easy to produce a more irrational mode of accounting for the progressive advancement of pathology, than some zealous partisans of this anatomist have advanced; but we think it can scarcely be disputed, that much of the precision of modern pathology is mainly to be attributed to the influence of his doctrines; and we are certain that the course of investigation which they have suggested has contributed, in a remarkable degree, to economize the time and labour of the pathological inquirer. In this respect, the indirect influence of his labours has been almost as great as the

* Of the different Kinds or Species of Inflammation, and the Causes to which those differences may be ascribed. By James Carmichael Smith, M. D.—*Medical Communications.* Vol. ii. p. 168.

actual perusal or intimate knowledge of them could have effected; for the spirit which has been thus diffused among medical observers, and the train of investigation into which they have been led, has operated on many to whom the general anatomy was known only through the indirect information of others. To our own countrymen, who do not advert to the condition of French medicine when Bichat appeared, these observations may appear unfounded; but their truth must be obvious, we think, to all who are moderately acquainted with the state of continental medicine in general about thirty years ago, and who know how much has since been done by Pinel, Corvisart, Laennec, &c. With the most distinguished mathematicians, the most dexterous and ingenious chemists, and, in truth, the most able philosophers in every other department, France could scarcely boast a single physician whose opinions or whose practice would enable him to bear a good comparison with an uninitiated youth who had spent his first year in the University of Edinburgh, or in lounging between St. Bartholomew's and Guy's Hospital. Paris, indeed, had always been celebrated for anatomical studies; but the impression which the appearance of Desault made is a sufficient proof, that, with the most admirable opportunities of dissection, and with the most extensive and magnificent hospitals in Europe, either their opportunities were thrown away with the most heedless inattention, or they knew not how to render available the treasures of knowledge to which they had access. To the French physicians and surgeons, John Hunter had lived and experimented and observed in vain: and we verily believe, that unless a man such as Bichat had risen among themselves, they would have gone on to the present day with their characteristic spirit and zeal in fighting, equating homologous terms, and detonating gases, with as much facility as any other accomplished European nation, but would never have thought it possible to be instructed by English surgeons or English pathologists.

It could scarcely be expected that the systematic views of Bichat, however correct, and however conformable to nature, when first announced, should, at an interval of fifteen or twenty years, be equally complete, or even true, in every detail; or convey to the student the information which he requires, as well at this hour as many years ago. The progress of anatomical and physiological science, and, we may add, chemical and pathological, which we are certain is not stationary, renders this in a great measure difficult, if not impossible; and almost no systematic work, however perfect or full, can be expected to supersede the necessity of further and more detailed investigation into the nature of the animal tissues. It is exceedingly probable, that, had the ingenious author, who was cut off at the

early age of 31, survived the publication of his work ten or even five years, he would himself have been the first to recognise its imperfections, and would have laboured, even amidst the fatiguing professional duties with which he was beginning to be overwhelmed, to improve the arrangement and the subordinate matter, and render it as perfect as the work of any individual author could be expected to be. The circumstances, however, to which we have alluded, have left the work in the same state in which it came from the hand of its master; and no one has yet appeared who has at once had the courage and the success to make any important or material changes in the arrangement, the advantages of which might recommend them to the majority of anatomists and pathologists. We have indeed seen new arrangements of the animal tissues by Chaussier, Dupuytren, and Richerand, but not one of them, so far as we know, has been so generally received as the original one of Bichat; nor do we think that any of them is so free from objection as that. M. Beclard, who is perhaps the best qualified, by his pursuits, opportunities, and habits of patient and careful observation, has had the wisdom to avoid this subject entirely; and the single circumstance of his doing so, and merely supplying what was wanting, and correcting what was erroneous, might well deter others from attempting what M. Beclard seems to have considered either as perfect as circumstances admitted, or so difficult as to render any attempt useless and ineffectual. He has, however, performed a much more scientific and valuable task. Instead of interfering with the general arrangement, he has collected all the information on the individual subjects which the observations and investigation of twenty years have supplied; and, by adding all the facts regarding the animal structures, has brought down the labours of his distinguished prototype to the present day. This work forms a kind of occasional commentary on those parts of Bichat's system, which imperfect observation, premature inference, or the natural and progressive acquisitions of science, have rendered defective or fallacious.

In our further analysis of the additions which M. B. has made to the work of Bichat, we shall attempt to exhibit a brief, but correct view of the present state of general anatomy, so far at least as the limits within which we are circumscribed will permit us.

It is generally known, that Bichat's arrangement presents the following twenty-one tissues as composing the various organs of the animal body. 1. The cellular system; 2. the nervous system of the animal functions; 3. the nervous system of the organic functions; 4. the arterial; 5. the venous; 6. the exhalant; 7. the absorbent and its glands or ganglions, as they are now called; 8. the osseous system; 9. the medullary; 10. the cartilaginous;

11. the fibrous system; 12. the fibro-cartilaginous; 13. the muscular system of the animal functions; 14. the muscular system of the organic functions; 15. the mucous; 16. the serous; 17. the synovial; 18. the system of the secreting glands; 19. the dermoid or cutaneous; 20. the epidermoid or cuticular; 21. the pilous system. These systems, as they were named, he subdivided into two classes; one of which, consisting of the common or generating systems, was generally, or at least extensively, distributed through every part of the body, and entered into the composition of all the other tissues so uniformly, that it was believed that no individual or particular system could exist without them. The second class of the organic tissues consists of those which are found only in certain determinate situations, and are never found either contributing to the organization of each other, or of the general tissues. To the first, Bichat referred the cellular, arterial, venous, exhalant, absorbent, and nervous; of the second class, every one will perceive examples in the osseous, cartilaginous, fibrous, and muscular systems, which cannot, in general, exist without some of the common ones at least, and which are found in certain regions and situations only, and may therefore be named particular or individual tissues.

Every one who is moderately familiar with the nature of animal bodies, will perceive that this division is more valuable as a convenient and useful artificial contrivance, than as a just and true arrangement, founded on natural distinctions. It is obvious, that the general tissues are by no means so universally distributed as the arrangement would lead one to infer; and this difficulty had not escaped the author himself, who admits, that, while in the majority of parts, we find exhalant vessels at least, several individual tissues present neither arteries nor veins, at least none which convey red blood; some little cellular membrane, and not a few, are entirely destitute of nerves. We should even be disposed to modify these conclusions, in order that they may more intimately accord with the truth of nature. The exhalant vessels, if they really exist, are to be viewed merely as terminations of arteries,—as arteries, in short, into which, in consequence of their tenuity, we cannot always trace the coloured parts of the blood; and it is scarcely requisite, therefore, to consider them as forming a system distinct from the arteries. The lymphatics have been long known to open ultimately into the venous system; and, as some recent observations have shown, that they communicate often directly with veins, and perform a duty vicarious in some degree to these vessels, they may, without much violence, be deemed a modification or variety of the venous system. On the general anatomy of the nerves, we had occasion to deliver our opinions pretty

fully some time ago, and our limits will not permit us at present to resume the subject. With such considerations in our mind, however, we think that, in framing an arrangement of the common textures, we must submit to the alternative, either of changing their name and character, or of reducing them to three at most; 1*st*, arteries with exhalants; 2*d*, veins with lymphatics; 3*d*, cellular membrane, which, under one form or other, seems to be more generally distributed than any other tissue whatever. But, as even under these limitations, objections must occur to the principle on which this class of organic tissues is founded; it would perhaps be preferable to derive their character from features more purely anatomical, to consider them as tissues of distribution or ramification, which would at once get over the error of saying that they are universally distributed, and express nothing more than the strict fact regarding the mode in which they are disposed throughout the body.

The general distribution of the cellular or parenchymatous system was first maintained by Haller and Aug. de Bergen, and afterwards more completely insisted on by Bordeu. Its appearance and properties are well known. The existence of cells, however, which was taught by these and most subsequent authors, has been rejected by Wolff, and, more recently, Blumenbach and J. F. Meckel have maintained a similar opinion. M. Beclard has adduced the proofs or arguments on which this dissent from the general doctrine is formed; and we think they may be referred to the following points. 1*st*, That the disposition of fibres or plates, of which the cells are said to consist, is referrible to the mode of dissection, exposition, and demonstration; that the appearance described is the effect of forcible separation and distension, precisely as a portion of softened glue or mucous matter is separated into thready filamentous fragments by frequent manipulation and violent stretching. 2*d*, In the same manner, if we understand M. B.'s statement correctly, these authors explain the effects and phenomena of fluids injected into the cellular tissue. The cells or cavities which anatomists demonstrate by insufflation, did not exist, they contend, previous to the introduction of the air, and are the result of the forcible separation of particles by the presence of a foreign body. We confess, that to us these objections seem by no means without force; and they would certainly not occur to minds either of an imitative or illogical character. But we think they derive much of their force from the misconception of the terms employed; and we are almost certain, that the difference between the descriptions of both parties is greatly less than the first glance of the subject would lead one to suppose. We are not unwilling to admit, that many writers have made the *cellular* arrangement a much more symmetrical and uniform

thing than it actually is; that they have often deceived themselves regarding the form of these cells, and the mode in which they communicate; for, when they inform us at once that this tissue is a series of cells, and that these cells communicate, that is, open into each other, they are certainly bound to state in what manner,—at the bottom, top, sides, or every where. If so, they are obviously improperly named cells; for the other party, we imagine, deny that to be a cell which is open every where. This whole matter amounts, therefore, to a mere difference in names—a sort of war of words, which is waged and prolonged purely because the parties neither conceive nor define accurately the subject of the contest. We consider it to be unquestionable, that there is beneath the adipose tissue on which the skin rests, a particular substance which envelopes all the muscles, enters between them and their fasciculi, surrounds the large vessels and nerves, is extended between the mucous membranes and the subjacent parts, the serous membranes and the subjacent parts; and that this substance is composed of very minute thready lines, which follow no uniform or invariable direction, but which, when gently raised by the forceps, presents a confused and irregular net-work; that between these lines there are spaces of a figure not easily ascertained, and perhaps not uniform;* that these spaces are naturally filled with the most common and usual of all fluids, the watery portion of the blood; and that they must naturally communicate, as there are, in the sound state, no sufficient barriers to prevent this communication. There are no broad plates, no honeycomb cells, nothing, in truth, which demonstrates a regular arrangement of cavities, such as some authors have fancied; and all that the most careful, but unbiassed observer can recognise, is an extensive interweaving of innumerable minute and slender threads, not exceeding the size of the silk-worm threads, and which would lead one to name it the filamentous or interlacing tissue.

The cellular tissue is found not only surrounding and enclosing all other organs, but penetrating into their substance, and uniting together the atoms or fibres of individual or peculiar tissues of which they are composed. In three situations it occurs extended in a continuous and uninterrupted form, on one surface of a particular order of organs; 1*st*, beneath the skin; 2*d*, beneath the mucous membranes; 3*d*, beneath the serous membranes. The subcutaneous cellular membrane is so generally known, that we must not occupy the time of our readers in any notice of it. The other two kinds seem to be almost entirely the same; they are both equally fine, dense, and delicate, as may be perceived on peeling off either the vil-

* Bichat, tome i. pp. 44, 45.

lous or serous membrane from a portion of intestine. The subserous is more susceptible of inflammation than the submucous; and while the former may become distended with air, as in emphysema,—or serum, as in general dropsy, these fluids are never found in the latter. Around the trunks of arteries, veins, and even nerves, we remark a species of cellular membrane, very close and compact, not easily divisible into its component fibres, and extended, like a membranous cylinder, round the vessel or nerve to which it is attached. This forms the cellular or external tunic of arteries, but ought not to be considered as belonging to the arterial tissue; it is simply a modification of the cellular system, suited to the situation in which it is placed. It is very similar to the submucous cellular tissue; never becomes the seat of serous or adipose deposites, and becomes inflamed only with the greatest difficulty. Analogous to this is the cellular envelop surrounding the veins, though greatly less compact and thick.

The most important point relating to this tissue, is the question of the difference or identity of the cellular and adipose membrane. Most of our readers are aware, that, in the British schools, it is taught, that the membrane in which adipose matter is deposited, is considerably different from the common cellular membrane, which is every where present. Bichat's arrangement led him to overlook the independent existence of an adipose membrane; but, in admitting that no fat is found in the cellular membrane of the penis, prepuce, scrotum, &c. beneath the mucous membranes, round arteries, and veins, in the brain and spinal chord, and in the substance of the lymphatic glands, and most of the organic systems, he considers the cellular membrane of these parts as peculiar; and he further observes, when speaking of the respective organization of these parts, that while real cells, or minute cavities, mutually communicating, are observed, nothing of this nature is recognised in the former situation. Although Bichat's account may seem to many, as to us, explicit enough, yet M. Beclard has certainly furnished a commentary of great value. According to the dissections of Aug. de Bergen* and Morgagni, and the demonstrations of W. Hunter and our author himself, the organization of the adipose tissue consists of rounded *pelotons*, separated from each other by furrows of various depths, of a figure irregularly oval, varying in diameter from a line to half an inch, according to the degree of corpulence, and the part submitted to examination. Each *peloton* is composed of small spheroidal particles, which may be easily separated by dissection, and

* Caroli Augusti a Bergen programma de Membrana Cellulosa, apud Haller Disput. Anatom. Select. Vol. III.

which are again said to consist of an assemblage of vesicles still more minute, and agglomerated together by a very fine and delicate cellular tissue. Many wonderful stories are related by microscopical observers, of the minuteness and various appearances which these ultimate vesicles present; but for the particulars we must refer to the observers themselves, viz. Monro, Wolff, and Clopton Havers, the first and last of whom observed them in the medulla of bones, and, brilliantly enough, compared them to strings of minute pearls. If the fat with which they are generally distended should disappear, which happens in many instances, the vesicles collapse, their cavity is obliterated, and they are confounded with the contiguous cellular membrane, without leaving any trace of their existence. Hunter, however, assures us, that in such circumstances the common cellular membrane differs from that which consists of adipose vesicles, in containing no obvious or similar cavities. It is indeed easy, on other grounds, to distinguish them from each other by obvious characters. 1*st*, The vesicles of the adipose membrane are closed all round, and, unlike the cellular tissue, they cannot be generally penetrated by fluids which are made to enter them. If, for example, the temperature of a portion of adipose membrane be raised, by means of warm water, to the liquifying point of the contents, they will remain unmoved so long as the structure of the vesicles is not injured by the heat. If, again, an adipose *peloton* be exposed to a solar heat of +40 centigr., although the adipose matter ought certainly to be completely liquified, yet not a drop will escape until the vesicles are divided, when it will appear in abundance. This structure of the adipose vesicles is of especial use in the animal body; for, if they were so disposed as to communicate, since their contents are nearly fluid in the living body, they would obey the impulse of gravity, and, like dropsical infiltrations, would uniformly incline towards the most depending region. 2*d*, It may be further remarked, that the adipose vesicles do not form, like the cellular tissue, a continuous whole, but are simply in mutual contiguity. This arrangement is demonstrated by actual inspection; but becomes more conspicuous in the case of dropsical effusions, when the cellular tissue which is interposed between the adipose molecules is completely infiltrated, while the latter are entirely unaffected. Lastly, M. B. might have remarked, the anatomical situation of the adipose membrane is very different from that of the cellular tissue. The former is found immediately beneath the skin, and between the folds of the peritoneum which form the omentum and mesentery, between the muscular and the membranous tissues of the heart, and round each kidney. It varies somewhat in these situations; and the quantity of adipose matter deposited is different in each region. In the least corpulent per-

sons, a considerable quantity of adipose matter is deposited in the adipose membrane of the cheeks, orbits, palms of the hand, soles of the feet, flexures of the joints, &c., round the kidneys, and beneath the pericardium. In more corpulent persons, and chiefly in females, it is found not merely in these situations, but extended in a layer of some thickness, almost uniformly over the whole person. In such individuals, it is most abundant in the neck, belly, mons veneris, and flexures of the joints.

The general anatomy of the arterial system presents a multitude of objects the most interesting and important to the physician and surgeon; but we must, however reluctantly, confine our observations to the mere organization or structure. Every arterial tube greater than one line in diameter, is visibly composed of one adventitious, and two essential substances. The internal surface of the arterial tube is formed by a very thin, semi-transparent, polished membrane, which is said to extend not only in the one direction over the surface of the left ventricle, auricle, and pulmonary veins, but in the other to form the minute vascular terminations which are distributed through the substance of the different organs. This membrane is particularly described by Bichat, under the name of common membrane of the system of red blood; because he believed it to exist wherever red blood was moving,—in the pulmonary veins, in the left side of the heart, and over the entire arterial system. It is distinguished during life by a remarkable activity in forming the morbid states to which arteries are liable. 1*st*, Its free or unattached surface becomes the seat of the adhesive inflammation, whenever the blood ceases to pass through it, either by the application of a ligature, or any gentle force which keeps the opposite sides of the vessels in contact. 2*d*, Its attached or adherent surface is generally the point at which osseous or calcareous matter is deposited, when an artery begins to be affected with what is usually called ossification.

Exterior to this common or internal membrane, is placed a dense, strong tunic of considerable thickness, of a dun, yellowish colour, and which, when minutely examined, is found to consist of fibres disposed in concentric circles, placed contiguous to each other, round the axis of the artery. If this substance be examined, either from without, or in the opposite direction, it will be found that, by the delicate management of the forceps, the fibres can be separated to an indefinite and incredible degree of minuteness, even to that of a hair; and that they uniformly separate in the same direction. Longitudinal fibres are visible neither in this nor in any other tissue of the arterial tube. This is the proper arterial tissue; the one which, in truth, essentially characterizes and distinguishes it from all others. Its dun yellow colour, which is uniform and invaria-

ble, is perceived through the semi-transparent internal membrane, and is more conspicuous either when this is removed, or when the external cellular envelop is detached, and the component threads separated from each other; and if it seem less remarkable in the smaller branches, it is because the tissue on which the colour depends is here considerably thinner. When a branch rises from a trunk, the circular fibres of this membrane separate, and form on each side a semi-circular hoop, from which arises a complete ring, within which are enclosed the smaller rings of the branch given off. These circular fibres proceed to the prominence of the common membrane which is observed within the arterial cavity.

The nature of the proper arterial tissue has formed one of the most contested points in all physiology; and an erroneous notion of its necessary connexion with the properties of the arteries in aiding the motion of the blood, and giving rise to morbid conditions of the circulation, has led to much controversy, and not a little violent reasoning. The muscular nature of the middle or proper tunic was long a favourite principle, and long sustained by many proofs and arguments. Bichat, however, examined these, and showed satisfactorily, as we think, that the arguments actually went for nothing, and that the proper arterial tissue was as different from muscular texture in any form and in any part, as it is possible for two things to differ from a third. The circumstances from which Bichat derived his proofs of the non-muscular nature of the proper arterial tissue, were chiefly the properties of this tissue, and certain facts by which he showed that the active and essential part of the circulation was performed by the heart. The arterial tissue, he remarked, was close, elastic, fragile, and easily divided by a ligature; the muscular tissue, on the other hand, was more loose, by no means elastic, and the ligature, the effect of which was exceedingly different, produced simply a cutting of the part to which it was immediately applied, and a strangulation, but no division of the subjacent parts. The action of alcohol, diluted acids, caloric by means of hot fluids, which are not corrosive, is likewise another proof of the difference of these tissues, all of which effect a species of crispation which seems to depend on the greater coagulation of one of the chemical principles.

To these proofs, which we think show that the arterial tissue by no means resembles any modification of the muscular system with which we are acquainted, a more direct one has since been added by Berzelius; who asserts that no fibrine can be shown to exist in the proper arterial tissue.* M. Beclard,

* A View of the Progress and Present State of Animal Chemistry. By Jons Jacob Berzelius, M. D. Professor of Medicine and Pharmacy, &c. &c. Lond. 1813. 24–25.

however, in enumerating the reasons assigned by such authors as Haller, Walter, and Sœmmering, for believing this substance muscular, asserts, that he has ascertained that it contains a certain quantity of this proximate principle. We are ignorant of the process or tests which M. Beclard has employed to determine this point; but we are in particular need of some powerful reasons to make us doubt the testimony of the Swedish chemist, who has devoted so much of his analytical ingenuity to the elucidation of the chemistry of animal bodies. But it may further be deemed an evidence against the muscular nature of the arterial tissue, that even Beclard himself expresses doubts of it; and concludes by saying, that it is better to refer it to the yellow fibrous or elastic system, than to account it a tissue, the basis of which is of a muscular or fibrinous nature.

When the attention is directed to the organic properties, or those which are most obvious during life, the same results are remarked. Neither a mechanical nor a chemical agent, applied as a stimulus, produces any change or motion in the arterial tissue. The puncture of a scalpel or needle demonstrates nothing like irritability. We have taken frequent occasion to verify this observation personally, by exposing the artery in a limb the moment after amputation, while the muscles were still in active motion; yet the most careful examination, with repeated application of the instrument directly to the arterial tissue, produced nothing like contraction, or the phenomena of irritability.

We are at a loss to understand why M. B., when speaking of the effects of the electric spark by Bikker and Van-den-Bos, and of galvanism by Vassalli-Eandi, Giulio, and Rossi, has omitted to notice the very interesting experiments of M. Nysten, who has taken singular pains to verify the opinions of Bichat, and disprove the conclusions of the Turin physiologists. Besides several unavailing attempts to excite the aorta in the human subject, immediately after the extinction of general life by decapitation, and when the muscular system, both voluntary and involuntary, was still in full contractile power, he was equally unsuccessful with the arteries of the living dog. Among other experiments, he details the following. "I tied," says M. Nysten, "in a living dog, the two trunks which arise from the arch of the aorta, and which supply the head and the thoracic extremities with blood; I tied the artery itself above the origin of the common iliacs. The animal died, as may be concluded, during this operation; and the aorta continued full of fluid blood. I pierced it as quickly as possible, near the middle of its length, by the pointed and open extremity of a glass tube, smaller than those employed in injecting the lymphatics with quicksilver. The moment the tube was intro-

duced, the blood rose in it to the height of 12 or 14 millimetres (6 or 7 lines). Having marked the point at which this fluid stood in the tube, which I then committed to an assistant, I applied galvanism to different parts of the aorta, which, however, exhibited no sensible motion; the blood remained in the tube at the same point to which it first rose; and it may be presumed, that the most trivial contraction of the artery would have made it ascend above this."*

The effect of chemical agents on the arterial tissue is equally inconclusive. The change which is effected is indeed a contraction, but it is decidedly the contraction of crispation,—takes place in the dead artery with as much facility as in the living —and is the result of the action of the substance employed on the coagulable matter of the tissue. It avails not to say that the entire division of an artery is followed by retraction, and diminution of its circular area; this is likewise an effect dependent on the mechanical or chemical nature of the tissue, on the elasticity and contractility in consequence of the absence of the distending force, and must not be regarded as any thing analogous or similar to irritability. It is indeed true, that many of these phenomena are most conspicuous while the artery may be said to continue in life, and are no longer observed when the body has been several days lifeless; but it is to be remarked, that such an event would by no means demonstrate the irritability of the tissue, but merely show that the characteristic properties were much influenced by the perfection and integrity of the organization; and were impaired or lost when this began to be effected in the ordinary course of decomposition. Such an event, it is obvious, is not peculiar to the arterial, and must await all the tissues, which quickly lose any properties by which they have been characterized, when deprived of those actions in which life consists.

It is not, however, by induction from direct observation of structure or properties, that the muscularity and irritability of the arterial tissue has been maintained. By a more circuitous, and inverted mode of reasoning, it has been supposed that the action of the circulating system could not be carried on without a muscular power in the arteries, and that, therefore, this muscular power must be inherent in this tissue. Ever since the mechanical and physical notions of Boerhaave were banished from physiology, and shown to be inconsistent with the properties of living beings and organic textures, a foolish and confused idea has prevailed among the imitative and unreflecting spirits of the profession, that all mechanical properties whatever

* Nouvelles Expériences Galvaniques faites sur les Organes Musculaires de l'Homme et des animaux à Sang Rouge, &c. Par P. H. Nysten, Médecin, &c. A Paris. Brumaire, An xi. pp. 325, 326.

ought to be excluded from the actions of the living body; and it was further imagined, that in supposing the arteries destitute of muscular power and irritability, one of the principal agents of circulation was destroyed. Much inconsistency and absurdity was thus encouraged; for it sems to have entirely escaped these physiologists, that the part of the system which was thus most perfect in power and structure, was in truth least in need of it. The proper arterial tissue is thickest, strongest, most abundant and conspicuous, in the large trunks, through which the blood is evidently impelled by the action of the heart alone; but smallest, weakest, and least distinct, in the branches and their divisions where the impulse of the heart is greatly less. The thickness and elasticity in the former situation, is requisite to resist and meet, in some degree, the force with which the heart acts and propels its contents; and it is in this way only that it promotes the motion of the fluid impelled. In the small branches, however, this tissue is so thin and scanty as to be scarcely perceptible; and it is not demonstrable, nor can we infer that it exists, in the capillaries. Yet your defenders of arterial muscularity and irritability justly contend, that here it is most necessary, since the action of the heart cannot operate in producing the blood's motion, which must, therefore, they argue, be accomplished by some power of the arteries. It is at this spot of the chain of reasoning that the incoherency is most conspicuous; for the unsophisticated inference from such premises, would obviously be the reverse of that which it is their object to prove. While we contend that the proper tunic of the arteries is not muscular, we do not deny that some peculiar power may exist in the capillary system, by which the blood may be moved through it; nor, in truth, is the non-muscularity and absence of irritability of the arterial tissue by any means connected with the properties or actions of the capillary system. It is impossible to avoid being surprised, if any thing could excite our surprise, at the confused and indistinct notions which have led physiological writers to suppose, that what was ascertained regarding large trunks of the arterial system, was applicable to the minute divisions and terminations of that system; or that, in explaining the properties and actions of the capillary system, we could derive all the necessary information from what we saw in the arterial tubes at large. Never, perhaps, was conclusion so impotent and inconsequent. The anatomical characters of the trunks and larger branches are very different from those of the minute divisions to which we give the name of capillary system; and, according to every rule of just and reasonable inference, there must be a material and palpable difference in physiological properties. While, therefore, we admit, in their fullest extent, the force of

the experiments of Haller, Home, Thomson, and other physiologists, as they apply to small arteries and capillary vessels, we positively deny that the conclusions thus formed can apply to the larger vessels.

The exterior surface of the proper arterial tissue is enveloped by a layer of dense cellular membrane, such as we have already noticed,—which is very firmly attached to it, and which was formerly considered a part of the arterial tissue. It is merely adventitious, a modification of cellular membrane, which establishes a communication between the artery and the contiguous parts, but is, notwithstanding, very necessary to the nutriment and heathly state of the vessel. It encloses and transmits the minute vessels, anciently denominated *vasa vasorum*; and, if it be detached even through a trifling extent, the arterial portion thus denuded is sure to become dead, to be effected with an inflammatory and sloughing action, and ultimately give way and discharge the contents of the vessel. M. Beclard considers it a fibro-cellular membrane, which may, in the large arteries, be divided into two layers, one external, more similar to the general cellular membrane, the other inside, between this and the proper tissue, yellowish and firm, but still sufficiently different from the proper arterial tissue. It is this tunic which we remove in dissecting arterial preparations; and it is not unimportant to remark, that in certain regions, for example the brain, this process is unnecessary, in consequence of the want of the cellular sheath; while in other situations, as the chest and abdomen, its absence is supplied by a portion of pericardium, pleura, or peritoneum. But, even where the arteries are partially covered by such membranes, we always find the delicate cellular tissue, a small portion of which seems to connect them to the arterial tube.

On the venous system, we shall refrain from any observations, as our limits prevent us from doing the subject justice.

After all that has been observed and written on the circulation, we cannot avoid thinking, that little is accurately known regarding the nature, actions and properties, of the capillary system. If any one will calmly interrogate himself, what he means by the term capillary system, he will quickly discover, we think, that a vague and undefined idea is attached to the term. Bichat informs us, that it is not only the common intermediate system between the arteries and veins, but the origin of all the exhalant and excreting vessels. If we reflect on the mode in which arteries have been said to terminate, and veins to take their origin, we shall discover, that in this view there are some points which are doubtful, and some which are inconsistent with the rest. Haller, and all the physiological authorities since his time, have concluded chiefly from the phe-

nomena of injections, sometimes from microscopical observation, and, where these failed, from the obscure and uncertain lights of what has been vaguely named analogy, that if an artery be traced to its last divisions, it will be found to terminate either directly in a vein or veins,—in excreting ducts,—in exhalants into some of the cavities or surfaces,—in lymphatics,—or in very small arterial vessels which convey only a colourless fluid. A similar application of the same facts has assigned a mode of origin to the veins not much unlike; and, if these conclusions be just, and be derived from trustworthy experiments and observations, we cannot avoid the inference, that the capillary system actually consists of all these orders of vessels. When we come to examine this more precisely, however, it will be found, that an inconsistency is implied, in saying that the red and colourless minute vessels, which alone are identical with the capillaries, are in the same rank with the exhalant and excreting vessels, and give rise to them. If they truly give rise to these vessels, it is absurd to say that they must be classed with them. But the existence of these same exhalants and excreting vessels seems by no means so certain as it has been represented. It is obvious, as M. B. has justly remarked, that if we are guided by strict observation, there are no more reasons in favour of the existence of exhalants, than of the lateral porosities of Mascagni. An experiment of Bleuland proves, indeed, that there are such things as vessels which convey a colourless part of the blood in direct communication with the arterial system; but these colourless terminations of arteries are likewise continuous with veins; and amidst the multitude of stories of injections, exudations, transudations, &c. we are not in possession of a single fact, by which we could certainly show, that these actually open on the surfaces or cavities in which they are said to open. The communication between the arteries and the excreting vessels is equally problematical, at least in several of the glands; for in the pancreas, in the salivary and lachrymal glands, the transit of any fluid thrown into the arteries is slow, difficult, and often imperfect; while it is much more rapid and uniform in the liver and kidneys. The whole doctrine, indeed, of the exhalant and excreting vessels is so obscure, so little susceptible of proof, and so pregnant with fanciful or fictitious matter, that it is impossible, in the present state of our information, to recognise what is taught concerning them as in any degree a portion of certain and unfluctuating science. To what conclusion, then, are we to come regarding the capillaries? in other words, in what mode do the arterial terminations communicate with the venous *radiculæ*, and what is the intermediate system which Bichat conceived to exist between these two orders of vessels? We are inclined to think, that the present state of the facts will admit of nothing more

to constitute this capillary system than those minute vessels, whether conveying coloured or colourless blood, in which injections show that arterial branches at once terminate, and venous *radiculæ* have their origin. But, in order to frame correct notions on the subject, it would be requisite to examine all the modifications of these vessels in every organ and texture, and to multiply, much more than has been hitherto done, the observations on the minute disposition of the vessels in each.

The second class of symptoms or tissues which occur in the composition of the animal body, consists of those which are peculiar to certain apparatus, which are confined to certain definite situations, and which, in composition, consist of two or more of the general tissues, with one which peculiarly distinguishes each of them. Bichat considered it a matter of indifference in what order they are arranged or examined; and, accordingly, does not attempt a division. We should however imagine, that a very natural line may be drawn between them in the following manner. Some of them are found to be of such a mechanical figure, that they are necessarily collected together in particular spots, and never found beyond these. Such are the bones, the muscles, the tendons, the ligaments, the cartilages, the fibro-cartilages, the glands, &c. Of others, again, the form is such, that they are stretched or extended over several textures or organs even of a different nature. Such are the membranous tissues or systems; for example, the most extensive of all, the skin and its appendages, the mucous or villous membranes, the serous membranes, the synovial and the fibrous membranes.

As the general anatomy of the osseous system is so extensive, that we cannot hope in this place to do it any justice, and whatever is ascertained is so generally accessible that this is in some degree unnecessary, we believe we shall not displease our readers by omitting the subject entirely. On the others, our observations must be brief and cursory.

The cartilaginous system is found at least in three different situations in the human body; 1*st*, On the articular extremities of the moveable bones; 2*d*, On the connecting surfaces of immoveable bones; 3*d*, In the parietes of certain cavities, in which the purposes of the animal economy require bodies of this elastic nature.

The organization of this tissue is obscure and indistinct; but, with a little attention, it is possible to recognise longitudinal fibres, which are intersected by others in an oblique and transverse direction, but without any determinate order. The most certain proof of their organic nature is the serous exudation, which appears in the course of a few seconds after a clean division of the cartilage by the knife. M. B. has been at some

pains to collect different opinions on the mode or style in which the fibres are arranged; all of them we conceive equally tenable, and equally incapable of being proved. Duhamel, he informs us, conceived them to be concentric plates,—a notion derived from certain appearances which he observed in his experiments on the bones of animals fed with madder. Hunter and Delassone, on the contrary, asserted, that the cartilages of the moveable articulations, which were easily broken in the direction of their thickness, presented perpendicular fibres implanted in the bones. The costal cartilages were supposed by Herissant to consist of spiral plates turned on each other; but by Mascagni, of bodies which radiated from the centre to the circumference of the substance.

Besides the peculiar and appropriate animal substance which characterizes this system, we find one or two of the common or generating tissues. Cellular texture is asserted by Bichat to form the mould or basis in which the cartilaginous substance is deposited. The capillary system carries from the arteries only the colourless parts of the blood into it; yet it is remarkable, that many other colouring substances, which are found occasionally in this fluid, communicate an obvious tinge to the cartilaginous parts; such is, for example, bile in jaundice, which uniformly renders them yellowish. No nerves are found in this tissue.

The fibrous system occurs in the human subject in two forms; either membranous and expanded, or fascicular and collected. Of the former, we find four varieties; 1*st*, the peculiar or proper fibrous membranes; 2*d*, the fibrous capsules; 3*d*, the tendinous sheaths; 4*th*, the aponeurotic coverings of muscles. The second consists of two varieties only, the tendons and the ligaments. This arrangement, which was formed by Bichat, included some animal substances which subsequent observation has shown to differ considerably from each other, and is therefore modified in the hands of M. Beclard, who proposes to divide the fibrous system into two great orders; one comprehending the white or albugineous fibrous organs of M. Chaussier; the other the yellow or elastic substances. As the former order coincides with the entire fibrous system of Bichat, with the exception of some species of ligaments, we shall merely notice them first, and subsequently advert to the yellow fibrous system of M. Beclard.

The proper fibrous membranes are the periosteum, the dura mater, the sclerotic, the albuginea, and the membranes of the kidneys. That of the spleen, which Bichat places in the same family, is considered by Beclard to differ so much, that he is inclined, though not very decidedly, to look on it as belonging to the tawny fibrous system.

The fibrous capsules, which ought to be distinguished from the synovial surfaces, are cylindrical bags which are found round certain articulations, especially the scapulo-humeral, and ilio-femoral, in which the motion of unlimited opposition requires membranes of their figure and strength.

The fibrous sheaths are perhaps the least extensive of the membranous forms of the fibrous system; they are found enclosing and supporting the tendons, particularly of long muscles, in situations where this disposition would force them from the bone or bones to which they are contiguous. They form, in this manner, an indirect attachment to the bone; and one of the principal effects proceeding from the property which they have of binding down, as it were, the tendons to which they are applied, is, that the direction of the motion of the muscle is altered by them. They are most numerous in the carpal and tarsal, and in the metacarpal and metatarsal regions.

The aponeuroses occur in the form of fibrous webs, which are uniformly connected with the locomotive muscles; to which they either act as general envelops and coverings, or as means of insertion and connexion with the osseous system. Of the former there are instances in the fascia lata of the thigh, and in the intermuscular fasciæ of the leg; and the latter variety is remarked in the attachment of the triceps, of the rectus, &c.; while we recognise a mixed character in the aponeurotic portion of the external oblique, which terminates in the ligament of Poupart.

The entire fibrous system is almost peculiar, in being all connected with itself, and forming one uniform whole, to which the periosteum, the most extensive division of it, is, as it were, a general or common centre. This will be obvious to any one who recalls the following considerations; 1*st*, that the dura mater, the external surface of which is an internal periosteum, is connected with the pericranium by the holes of the cranium; 2*d*, that in the fibrous capsules, each extremity is interwoven with the periosteum of the bones, which form the articulation; 3*d*, that the fibres of the tendinous sheaths, all the aponeuroses, the tendons, and the ligaments, are interwoven and mingled with the periosteum. The only exception to this arrangement is the albuginea, the perichondrium of the laryngeal cartilages, and the investing membrane of the kidneys.

Whatever be the form in which these various parts are presented, the organization seems to be essentially the same. An animal substance of a whitish colour, formed like a small, but strong thread, very tough, and somewhat elastic, is the individual element into which it may be generally resolved. Several of these placed in parallel juxtaposition, and connected by cellular membrane, give rise to the fibrous appearance by which

the system has been long distinguished. But in some of the modifications, instead of the parallel arrangement, we remark the fibres running in every direction. This is most obvious in the membranous forms of the fibrous system, as the periosteum, dura mater, &c. The properties of this tissue are chiefly of a physical nature. Those which are vital, are simply such as are referrible to its nutrition and organization. It is powerfully resisting, and is perhaps one of the strongest tissues in the animal body. The action of caloric, alcohol, and diluted acids, induces crispation in a very conspicuous manner;—an effect which is principally to be ascribed to the change induced in the albuminous substance which seems to form the chief chemical principle in them. Like the cartilaginous tissue, the common systems which are found in it, are referrible to the exhaling terminations of arteries, and colourless veins; no nerves have ever been recognised; and Bichat expresses his ignorance of absorbents being traced into the fibrous system. It is a point of some interest in the relations and connexions of the fibrous system, that it is almost the only one which forms the tribe of compound membranes, which consist of a serous or a mucous or a synovial membrane united to a fibrous one. There is indeed scarcely such a thing as a simple membrane to be found in the animal structure. The dura mater is by no means such; for the outer or cranial portion is distinctly fibrous in structure and uses; while the inner, or cerebral, is formed by a reflection of the arachnoid membrane. The same may be said of the bag of the pericardium, the exterior layer of which pertains to the fibrous system; but the internal is a true serous or diaphanous membrane, a continuation and reflection of the pericardium of the heart.

The yellow ligaments which connect the spinous processes of the vertebræ to each other, differ considerably from the divisions of this system, and have suggested to M. Beclard the necessity of establishing a particular order of fibrous tissues, to which he proposes to apply the name of yellow or tawny fibrous system. Under this head he includes, as we have already noticed, the proper membrane of the arteries, that of the veins and of the lymphatic vessels, the membranes which form excretory ducts, that of the air passages, the fibrous covering of the cavernous body, the membrane of the ureter, and perhaps that of the spleen. The actions, and particularly the occasional distensions to which these parts are liable, require a resisting power, which may at once counteract any extraordinary effort, and cause them to resume their original state, as soon as the distending causes cease to operate. This tissue occurs indeed in every situation which requires a resisting power in constant operation; and in this respect differs from the ordinary fibrous tissue, of which the resistance is merely passive; and also from the muscular, the resistance of which continues merely during the con-

traction of the fibre. In the lower animals, these purposes are more conspicuous than in the human subject. The posterior cervical ligament (*ligamentum nuchae*), counteracts the tendency to inclination of the head; and a similar membrane strengthens the abdominal parietes, and resists the weight of the viscera. In the whole of the feline tribe, an elastic ligament inserted into the unguinal phalanges retains them in the extended state so long as the muscles do not alter their direction. The shells of the bivalve molluscous animals, as oysters, muscles, &c. are opened by a similar fibrous tissue, as soon as the muscles by which they are closed are relaxed.

The disposition of the component fibres is the same in the elastic as in the common white fibrous system. Their colour, which is yellow or tawny, is generally more obvious in the dead subject. They are said to be less tenacious, but more elastic, than those of any other tissue. In respect to chemical composition, they appear to contain a considerable quantity of fibrine, combined with a little gelatine and albumen.

Intermediate between the cartilaginous and the fibrous system, Bichat ranked that of the fibro-cartilages, which comprehends three subdivisions; 1*st*, the membranous fibro-cartilages, as those of the ears, nose, trachea, eyelids, &c; 2*d*, the inter-articular fibro-cartilages, as those found in the temporo-maxillary, and femoro-tibial articulations, the inter-vertebral substances, &c.; 3*d*, certain portions of the periosteum, in which, when a tendinous sheath is formed, the peculiar nature of the fibrous system disappears, and is succeeded by a modification evidently belonging to the class of fibro-cartilages.

M. Beclard has followed Meckel in rejecting the first of these subdivisions, the objects of which do not differ in nature from common cartilage. Like it, they do not present the distinct fibrous structure, but are covered by a perichondrium, the fibres of which have evidently misled those who account them fibro-cartilaginous.

M. Beclard has given the following synoptical table of this system.

The Fibro-Cartilages are—

- I. Articular;— connected with the articular surfaces of bones; they may be divided into
  - 1. Free, or unattached; those of the inferior maxillary bone.
  - 2. Attached
    - α. by their extremities; those of the clavicle, of the inferior extremity of the ulna, of the knee-joint.
    - β. by one of two surfaces; the circular cartilages of the glenoid and cotyloid cavity.
    - γ. by both surfaces; the inter-vertebral substances, those of the pubal bones, those between the sacrum and ilium.
- II. Tendinous;— almost all of them correspond to tendons.
  - 1. Flattened; those of tendinous sheaths.
  - 2. Circular; the pulley of the superior oblique of the eye, the annular ligament of the radius.

In presenting the general anatomy of the muscular organs of the human body, the substance of the ancient arrangement of voluntary and involuntary muscles was retained by Bichat, under the peculiar names of muscles of the animal and organic life; while a few, *e. g.* the diaphragm, urinary bladder, &c. seem to be of a mixed nature.

The intimate structure of these varieties of the muscular system, differs in a few minute particulars. They all agree in being formed of peculiar fibres or lines, consisting certainly of a particular proximate principle, generally of reddish or fawn colour, sometimes however white. Some inquirers have bestowed much pains and time in ascertaining the size or volume of these fibres; but this inquiry seems to be essentially absurd, for the visible size of the fibre evidently varies in different muscles. The fibre, or rather the component line, is most minute in the muscles of the organic life, in the heart, for example, and in the muscular parts of the alimentary canal; it is larger and more distinct in the diaphragm and some of the muscles of the perinæum, in the psoas magnus, &c.: and it is very large and coarse in most of the muscles which move the extremities.

But the most fruitless and chimerical part of the inquiry into the muscular organization, is that regarding the cylindrical or globular figure of the fibre. Bichat seems to have been aware that nothing was ascertained, and that this attempt to go beyond what was simply visible, and to resolve the apparent fibre into more minute elements, was at once liable to great fallacy, was a source of much fancy, and was not to be attended with any useful result. The intimate nature of this fibre is absolutely unknown; and whatever has been said on its continuity with vascular and nervous extremities, on the supposed cavity, and the marrow which this cavity was imagined to contain, is only a collection of vague and fanciful ideas, which are confirmed by no positive proof, and with which a methodical and rigorous mind ought not to be satisfied. Notwithstanding the opinion thus expressed by Bichat, our author has laid before his readers a short analysis of the labours and opinions of anatomical authors on the minute nature of this fibre;—a task which he has performed better than it merited; for we must say that, notwithstanding the great names which have been connected with this profound and delicate investigation, it is impossible for us to recognise any new or ascertained fact,—any precise information on which we might rely. We are indeed satisfied, that the ingenious manipulation of Muys, the dreams of Prochaska, and the micrometical labours of Sprengel, have done nothing for the general anatomy of this system, more than had been effected by the unaided scalpel and forceps, with the effects produced by maceration and boiling; and though the

microscopical observations of Meckel and Sir Everard Home were verified, we cannot perceive in what manner the knowledge, that a muscular fibre consists of opaque globules connected by a transparent medium, could render the properties or functions more intelligible.

We cannot agree with the conclusion to which M. Beclard has come, on the dependence of the muscular irritability on the nerves which are distributed on these organs; nor do we think that the arguments which he has adduced, either in opposition to those of Bichat, or in defence of his own opinion, are sufficient to settle the point in an undoubted and unequivocal manner. In expressing ourselves thus, we are not influenced solely by the reasonings of Bichat, but by the two facts, that the contractility of the different muscles bears no proportion to the number or quantity of nervous filaments going to these muscles; and that it is quite possible for this property to be much impaired, or wholly destroyed, in one or more muscles, while the nerves are entirely unaffected. It is well known, that the nervous filaments which go to the heart are so minute and so few, that authors of no ordinary authority have denied that this organ received any nerves at all; yet it retains the property of excitability, irritability, or contractility, much longer, and in greater perfection, than the pectoral, the gastrocnemius, or the deltoid, in all of which we perceive much larger and more numerous nervous fibrils; and there are local forms of paralysis, in which no agent, either electrical or galvanic, can induce contractions, yet the nervous branches are found, on examination, completely unchanged. This is scarcely the place to enter on a subject so complicated, and demanding so much rational examination and cautious inference; but to us it appears, that all that we hitherto know of the mutual relations of the nervous and the muscular system, show, that irritability, contractility, or excitability, is a property inherent in, and peculiar to, the muscular fibre; and that the chief use of the nervous system is to regulate and direct the actions which are the direct result of this irritability, and which would be liable to numerous deviations without such a regulating influence; and to place the muscular system in general, and the voluntary one in particular, *in relation*, if we may express the fact in such language, with such other organs as the sound state of the body requires.

The most extraordinary part of Bichat's ideas on the motions of the organic muscles, is that of their dilatation or relaxation, as it would be called, being a phenomenon as vital as their contraction; that it was not a passive state which succeeded to their contraction, and was not occasioned by the forcible introduction of some substance into their cavity, but an active condition, depending as much on the power of the muscular

fibres as their contraction. The whole of the arguments which he has adduced may be referred to a different mode of expressing the same fact,—exactly as the dispute with which the chemical world have been so long perplexed, about the positive or negative nature of cold,—whether it were a positive quality, or merely the absence of heat.

While M. Beclard does not absolutely deny that the involuntary muscles may be dilated, and the voluntary ones lengthened, by a proper vital power, he nevertheless considers most of the facts from which these conclusions have been derived, as depending on causes which have no concern in producing the effect in question, or as the result of the cessation of those actions in which the shortening of muscles consists. The protrusion of the tongue, the elongation of the proboscis of the elephant, of the bodies of certain reptiles in creeping, which are the instances commonly adduced, are not examples of direct muscular elongation, but are the result of the shortening of other muscles. In the leech, for example, there are two orders of muscular fibres, one longitudinal, the other circular; and though the contraction of the former necessarily shortens the body of the animal, yet when these are relaxed, and the circular ones thrown into action, the effect is to lengthen and extenuate the leech. The proboscis of the elephant is likewise subject to the action of two orders of fibres, by one of which, the longitudinal, it is shortened, while, by the other, which radiate, the organ is elongated and extended. Our author therefore concludes, that this opinion,—so inconsistent with the phenomena of muscular action,—has originated in ignorance of the true arrangement of muscular fibres, and incapacity to estimate the various effects of the contraction of these fibres in the direction of their arrangement.

The individual organized systems, or tissues, which we have hitherto noticed, are of such a configuration, that their situation and extent is limited principally to the locomotive apparatus, or to particular regions of the internal organs. But a very important and interesting order of tissues, of a different character, is presented in the skin, the villous or mucous membranes, and the diaphanous or serous membranes. In all of these, the physiologist remarks a great extent of surface, which is stretched over many tissues and organs exceedingly different in structure and properties, and which is the seat of several of the most important actions of the animal body; and the two latter, the mucous and serous membranes, are placed in such relation to each other, that in general they form the opposite surfaces of the same organ, or part of an organ.

Of the first of these membranous organs, the most uncertain point is the existence of the corpus mucosum. Haller, Cam-

per, and Blumenbach were inclined to deny the existence of this part of the cutaneous system in the skin of the white, and to admit it in the negro only. According to M. Chaussier, the skin consists of two parts only, the derma or cutis vera, and the epidermis or cuticle; the first embracing all the organic elements of this tissue, between which it was impossible to establish any distinction; the second being an inorganic substance, prepared by the organic, and deposited on its surface. Beclard, however, is of a contrary opinion, and thinks, that a peculiar matter, which occasions the colour by which the different races are to be distinguished, is found between the exterior surface of the corion and its semi-transparent covering, and that no fair race is destitute of it, except the *albino*, the peculiar appearance of whom he attributes to the absence of the mucous net of the skin. To these conclusions M. B. has been led, principally by the recent observations of M. Gaultier on the Skin of the Negro, and those of M. Dutrochet on the Cutaneous Tissue of Quadrupeds. According to the former of these authorities, the mucous body of the negro skin consists of four parts; 1*st*, a series of minute vascular bundles, to which M. G. has applied the name of "bourgeons sanguins," and which are really the termination of vessels ramified on the papillæ; 2*d*, the deep whitish layer, consisting of white vessels, and indicated in an oblique section of the negro skin, by a white line between the surface of the corion and a darker undulating line; 3*d*, the coloured layer, named by M. G. *gemmules*,—the true colouring matter of the skin,—indicated by the undulating line already noticed; 4*th*, the superficial white layer, consisting of serous vessels as the first, indicated by a white line between the dark undulating line and the cuticle.

As the first of these parts, viz. the vascular eminences (*bourgeons*), are merely the terminations of the cutaneous papillæ, M. B. is inclined to follow M. Dutrochet in reducing the constituent parts of the colouring net to three. According to this view, we find the following enumeration of the individual parts of the cutaneous system given by M. Dutrochet. 1*st*, The derma, or corion, the true skin of the ancient anatomists; 2*d*, the papillæ, or minute elevations of this membrane; 3*d*, the epidermal membrane of the papillæ, which is the deep whitish layer of M. Gaultier; 4*th*, a coloured layer, the proper colouring matter of the skin; 5*th*, a horny layer, which corresponds to the superficial whitish layer of Gaultier; and, 6*th*, the epidermis, or cuticle.

By removing the epidermis of negro skin by long maceration, the colouring matter may be obtained separately. Beclard thinks it analogous to the colouring matter of the blood; and informs us, that it is derived neither from the coloured layer,

nor the *gemmules* in which it is situated, but from the papillæ; an inference which he seems to draw from the phenomena observed in removing the negro epidermis by vesication, when the part so treated is found at first white, and afterwards beginning to become coloured at many minute points, which gradually enlarge, and ultimately coalesce with each other. The view of Gaultier himself, that this matter is secreted by the hairs, is quite inadmissible, since it is not restricted to the bulbs of this system, but uniformly diffused over the whole surface.

To demonstrate the moveable nature of the colouring matter, our author has recourse to the examples mentioned by authors, of women becoming black during pregnancy, of men undergoing the same change in consequence of mental vexation, and of negroes losing their colour in old age, and in diseases. The skin of the new born negro, he remarks, is not black, but like the fairer races, is red, and only slightly yellowish. After birth, however, the nails, eyes, nipples, and the genital parts, are surrounded with a brown circle; on the third day these parts only are black, and the rest of the person is hitherto merely of a tawny colour. On the seventh day, the colouring is generally diffused, but continues pale, and indifferently marked during infancy; its intensity augments gradually with the growth and age of the individual; but the parts first coloured are observed, during life, to be of the deepest shade. These successive changes, which, it must be admitted, are observed in the fair tribes of the human race, induce M. B. to conclude, that the colouring matter is in unceasing motion, and that it is constantly undergoing an alternate secretion and absorption.

We must presume that our readers are well acquainted with the general distribution and course of the mucous membranes; that they are aware that the first division, or gastro-pulmonary, comprehends that membranous surface, which commences at the various orifices of the face, at which it is contiguous with the skin, and is continued through the lachrymal and nasal passages, by the larynx on the one hand to the bronchial membrane, and by the œsophagus on the other through the entire tract of the alimentary canal, at the opposite extremity of which it is again identified with the skin.

The distribution of the second, or genito-urinary mucous membrane, is slightly varied, according to the differences of sex. In the male it is connected with the skin at the orifice of the urethra, from which it proceeds inwards toward the bladder; sending previously small prolongations through the ducts on either side of the veru montanum, from which it is believed to be continued through the vasa deferentia to the vasa efferentia of the testicle. Continued over the inner surface of the urinary bladder, it is prolonged through the ureters into the

pelvis and infundibula of the kidney. In the female, besides passing in this direction, it ascends into the uterus, and passes through the fallopian tubes, at the open extremity of which it terminates in an abrupt opening into the sac of the peritoneum; the only instance in the whole body in which a mucous and a serous surface communicate directly and freely.

These two great membranous tissues have each two surfaces, an attached or adherent, and a free one. The adherent surface is attached, 1*st*, to muscles, as in the tongue, most of the mouth and fauces, œsophagus, and entire alimentary canal and bladder; 2*d*, to fibrous membranes, as in the nasal cavities and part of the larynx, in which it is attached to periosteum or perichondrium, the palate, ureter, and pelvis of the kidney; 3*d*, to fibro-cartilages, as in the trachea.

Those parts of the gastric division of the mucous membrane, the adherent surface of which is attached to muscular organs, undergo very considerable changes in motion. That at the cardiac extremity of the œsophagus is propelled into the stomach in the form of a round thickened ring, every time that a quantity of food is conveyed into that viscus. In the same manner, the villous membrane of the rectum is protruded outwards, and made to assume a similar form whenever the contents of that bowel are expelled. Throughout the whole canal, in short, it is made to undergo various motions and changes, according to the action of the muscular parts.

The surface of these membranes is by no means uniform, or similar in every part. The appearance of the pituitary or schneiderian membrane, is very different from that of the stomach or intestines; and the free surface of the urethra is unlike that of the bladder. These differences in appearance depend on a real difference of structure, and are connected with a difference in properties; yet it may be observed, that anatomists have, unwisely enough, applied what they ascertained or saw in one part to the whole, and have thus created a system, in which some truth is blended with considerable misrepresentation; and many assertions which are correct in one respect, are totally unfounded in others. We shall say nothing of the mucous corion, or that firm, dense, gray substance, which seems to form the groundwork of the membrane in most regions, but which is perhaps represented by the fibrous system in some other points. We must, however, deny the analogy or identity of the papillæ and the villosities; and we have no hesitation in saying, that neither the one nor the other are essential or necessary to a mucous membrane. We agree with Bichat in admitting it as an anatomical fact, that papillæ are met with in some parts where the mucous membranes originate; but we cannot discover that these minute bodies are to the origins of the mucous

surfaces, what the minute piles named villosities are to the intestinal mucous membrane. While, therefore, we do not admit, in this situation, the ampullæ of Lieberkuhn, or the erectile vessels of other authors, we do not see that much more information is communicated by naming them *foliola*, or comparing them to the flattened leaflets of the gramineous plants; or, as Rudolphi has done, to plates or minute scales which cover the whole internal surface of the intestine. Nothing, in truth, appears to us so certain, as that the structure of the mucous surface varies in every situation and in every organ; and it is only in particular regions that this structure is sufficiently marked to admit of examination. The mucous surface of the intestines is best examined by detaching, inverting, and inflating a portion of ilium. When this is immersed in pure water, the observer may perceive, by means of its refracting power, an infinity of minute prolongations, which are made to wave or move gently amidst the fluid; but even a very powerful magnifying glass does not render them so distinct as to determine whether they are round or flattened, whether they are solid or hollow, or whether they are obtuse or acuminated. In no other region are they seen so distinctly; and if this be all that it is possible to ascertain, we rather think that, unless more powerful means be discovered of aiding our observation, it will be long impossible to obtain any precise or positive knowledge regarding the minute structure of these membranes.

In certain points, where a communication is observed between the general mucous surface and the cavities or recesses of particular regions, anatomists have not demonstrated a mucous membrane, but have inferred its existence as a continuation of the general surface. In the tympanal cavity, to which the eustachian tube leads, the existence of a mucous or fibro-mucous membrane is rather presumed from analogy than proved by direct and unequivocal observation. We know that, where the biliary and pancreatic ducts enter the duodenum, and for a considerable space upwards, the interior appearance is that of a fine mucous membrane, provided with lacunæ and villosities; but we have no direct means of saying, at what point of the hepatic duct, or the smaller canals of which it is formed, this mucous membrane terminates. When we trace the tracheal membrane to the bronchial divisions, it is utterly impossible to recognise any arrangement either of papillæ, piles, or villosities; and nothing is perceived excepting a smooth, uniform surface, of a colour between gray, dun, and red or purple, which is moistened with a viscid semi-transparent fluid, and which is as like the peritoneum as the intestinal mucous membrane. But the situation where the existence of the mucous system, though believed,

is most uncertain, is in the interior of the vasa deferentia, and where they take their origin from the vasa efferentia of the testis. No evidence of a sensible nature can be obtained regarding the organization of these tubes; and whatever is stated concerning it, is the result of analogical inference.

Though these membranes have been named mucous, yet an erroneous notion would be communicated, if it were said that, in every region, the action of their surface were the same. It may not, perhaps, be easy to limit the signification of the term mucus; but it is certain that many parts of this surface never, in the healthy state, secrete this animal matter; and, in others, the membrane is almost always moistened with a different fluid. The mucous membrane of the palpebræ is never occupied with mucus in the healthy state, but is uniformly moistened with the tears; the membrane of the mouth and throat is moistened with the saliva; the urethra presents merely a peculiar moist fluid, which seems principally to exude from many minute vessels which open along its surface, or in the lacunæ. All those parts, in short, which are not in constant contact with foreign or secreted substances, seem to present no mucus in the healthy state; whereas the surfaces of the stomach, intestines, gall-bladder, and urinary bladder, are almost constantly covered with a quantity more or less considerable of this animal secretion.

The length to which this article has extended, must be our apology for omitting entirely many subjects on which it became us to bestow some attention. Several tissues which we ought to consider, the want of room,—not their want of interest or importance, compels us to pass over unnoticed. Neither the erectile, the glandular, the synovial, the medullary, nor the pilous systems, have yet occupied our attention. Of the serous, our author speaks not, unless in a pathological respect;—and this comes not within our present plan. The same may be said of the concluding part of the work, in which, under the name of accidental tissues, M. B. treats of the development of tubercles, scirrhus, cancer, and melanosis,—subjects to which an entire volume might be profitably devoted. In concluding thus hastily, therefore, we shall satisfy ourselves with a general reference on all these points to the work itself, in which the curiosity of our readers will be rewarded with much valuable and interesting information.

1. *The Croonian Lecture. Microscopical Observations on the following Subjects—On the Discovery of Valves in the Branches of the Vas Breve, lying between the Villous and Muscular Coats of the Stomach. On the Structure of the Spleen.* By Sir EVERARD HOME, Bart. V. P. R. S.
[Read December 7th, 1820.]

2. *Versuche uber die Verrichtung der Milz und die geheimen Harn-Wege.* Von T. TIEDEMANN und L. GMELIN, Professoren in Heidelberg. pp. 119. 8vo. Heidelberg, 1820.

(From the Edinburgh Medical and Surgical Journal, for April, 1822.)

In concluding our account of the experiments of Tiedemann and Gmelin on Absorption, we stated that we were prevented, by want of room, from noticing some interesting observations and experiments on the Functions of the Spleen. The publication of the paper of Sir Everard Home, which has taken place since that time, has put us in mind of the promise which we then made of calling the attention of our readers to this obscure and perplexing question in physiology.

Two very important and difficult inquiries present themselves to the physiologist at his very outset in this investigation. 1*st*, What is the nature of the minute structure of the spleen—in what peculiar manner are its vessels disposed—by what particular arrangement is it distinguished from other organs—and, in fine, among what order or system of tissues is it to be ranked? 2*d*, What peculiar changes are induced on the blood which is conveyed through these vessels; and in what manner are these changes subservient or necessary to the healthy state of the living body?

The first is one of those subjects on which numberless conjectures have been combined with a few observations, in order to give something like a plausible statement. Yet the reputation of those who have observed, might appear a warrant in some degree for their fidelity and accuracy, did it not appear that the best of them even cannot be said to have been exempted from those causes of error which preconceived opinions never fail to foster. It is on this account that we cannot place much reliance on the microscopical observations of Lewenhoek, the descriptions of Malpighi, or even the minute and penetrating injections of Ruysch; and perhaps less inconvenience and misconception would beset any one who would determine to divest himself of every previous notion, to unlearn every thing which he had been taught, and to apply himself, with assiduity and patience, to the personal examination of the organ, than those who attempt, after a laborious collation of various opinions and authorities, to elicit something which might at once

agree with all, and not be inconsistent with the probable state of the fact. We, in truth, can scarcely at present remember a more perplexing, and, we may add, discouraging task, than the examination which we at one period undertook of the statements which are found recorded by these sedulous ancients of the objects which each had respectively perceived, and of the discoveries which each imagined he had made.

We shall therefore hold ourselves perfectly excused in waving entirely almost any reference to the labours of those anatomists whom we have mentioned, while we call the attention of our readers to the part of the inquiry most essential to the subject in hand; and, at the same time, submit to their consideration the result of Sir E. Home's labours.

After all the examination and injection which has been tried with this organ, the great point which is doubtful, and on which, perhaps, depends the solution of the problem of its functions, is, whether there be a peculiar or proper substance of which the spleen is composed; or if it be simply a minute and infinite interlacement of arteries, veins, and lymphatics? Is there any tissue, or peculiar animal substance, which characterizes the spleen, and by which it is to be distinguished from every other organ? It is obvious that, in this difficulty, we cannot be aided by the vague comparisons which have been made to the structure of a sponge, or the uncertain descriptions which have been given of its cellular nature; nor is it possible to place greater faith in the *acini*, which Malpighi imagined he could recognise in their cells. The author who has, in these latter days, investigated this point with the greatest assiduity and attention, is Heusinger, who found certain whitish bodies, occasionally small, occasionally dilated, which, when air is impelled into the spleen by any venous branch, disappear, while the part in which they were found becomes pellucid, and many membranous parietes may be recognised. If, again, a small incision be made in the part, these membranous parietes disappear, and the globular whitish bodies are again visible. This phenomenon, together with the results of injections either by the arteries or veins, but especially the latter, lead this author to infer, that these small membranous bodies are vesicles or minute glands, which are abundantly supplied with blood-vessels,—which are liable to occasional dilatation in various degrees,—and which, in short, when filled, would, by mutual compression, assume the hexagonal figure. The general accuracy of these observations is admitted by Dr. Hopfengaertner, a very intelligent young physician of Tubingen, who made the anatomical structure of the spleen the subject of a very excellent inaugural dissertation. But Heusinger, he thinks, was misled in considering these bodies separate glands; for the globular and separate figure is

found, according to Dr. H., only at the surface of the spleen; but, in the interior, it is found to pass into cylindrical turnings or convolutions (*gyri*). We may further notice, that the experiments of Dr. Hopfengaertner induce him to conclude, that the great mass of the spleen consists of what he names the proper substance, which is very soft and fluid, but of the minute nature of which we cannot discover that he otherwise speaks very distinctly; that it may be injected both by arteries and veins, and partly by the lymphatics; but that the fluid part only of the injected matter can enter this, unless it be forcibly ruptured; and that nowhere in the spleen can the direct passage of minute arteries into venous *radiculæ* be demonstrated. Such are the most recent, and, perhaps, the most certain and credible statements concerning the existence of a peculiar splenic tissue. But although we have almost as much confidence in the accuracy of both these observers as it is possible for us to have in our own personal observations, yet we must admit our utter inability to derive from them any information whatever regarding the uses of the organ.

Although it be impossible to deny that certain whitish bodies, evidently different from blood-vessels, are observed in the recent section of the splenic substance, yet we find that all do not consider these bodies of the same nature; and that, in short, this peculiar splenic parenchyma, or tissue, is not admitted by several observers of no ordinary authority. According to Sir E. Home, these whitish bodies are not of an organic nature, but are merely globules of lymph and mucus, contained in the cells which are found in the organ only, when the process of chymification is either going on, or has not been long finished.

"Wednesday, August 23, 1820, at 12 o'clock, a healthy, large spleen, taken from a man 28 years of age, was cut into eight transverse slices, nearly of the same thickness. Four of these were put into one flat dish, and four into another; both of these were filled with distilled water; no colouring matter was given out, although the surfaces had all a red colour. The cells were unusually distinct, and had a degree of uniformity in their appearance. On examining the cells under water with a common lens, they appeared full; on turning them over in the water, something colourless fell out, carrying no colouring matter along with it. The same thing happened on turning up the opposite side."

This something colourless proved to be lymph-globules. On the following day (24th), when these cells were examined by a lens, those of the upper surface appeared hollow and empty; but those below appeared full of a mucus soaked in water, and a film was spread over the surface of several of them. The two subsequent days (25th and 26th), the cells of both surfaces were filled with flocculent mucus, and appeared latterly to swell.

and rise above the surface. After this they became flat, till the 29th, when a light coloured point was observed in the centre of each; and no material change seems to have taken place for several days, unless those which arose from the decomposition of the portions employed for examination. On the 8th September (sixteen days from the time when the sections were made), the cells, which till that time had been very distinct, and were still visible on the inferior surface, had disappeared entirely from the upper one; and four days after, on the 12th September, every thing was removed by the putrefactive and washing process, and nothing was to be seen but a uniform mass of vascular branches. We may notice, that the water was changed daily.

"August 29th, same year. The spleen of a woman who had taken little food for some time,—hardly more than one-third the size of the other,—contained no cells, and consequently no corpuscules; was treated in the same manner, and the changes it underwent were the same."

"The spleen," concludes Sir Everard, "from this account, consists of blood-vessels, between which there is no cellular membrane; and the interstices are filled with serum, and the colouring matter of the blood from the lateral orifices in the veins, when these vessels are in a distended state; which serum is afterwards removed by the numberless absorbents belonging to the organ, and carried into the thoracic duct by a very large absorbent trunk.

"That all the apparent fibres are vascular, is proved by the representation in Plate III. fig. 1., in which they are minutely injected, and the injection is carried into the cells, and moulded into their form. The lymph globules carry along with them, into the interstices, carbonic acid gas, and the mucus, soluble in water, in great abundance; but no blood globules, since none are formed in the cells. As soon as the lymph is at rest, the carbonic acid gas being let loose, forms the cells that surround the lymph globules, the sides of which are held together by the mucus, putting on the appearance of corpuscles without colour, and are thus mistaken for glands. The gas is absorbed by the blood in the arteries and veins.

"The spleen, from this mechanism, appears to be a reservoir for the superabundant serum, lymph globules, soluble mucus, and colouring matter, carried into the circulation immediately after the process of digestion is completed."

To prove more certainly this vascular nature of the splenic structure, our author gives, in his eighth engraving, a very distinct, and, we dare say, accurate representation of a section, in which nothing can be recognised but a minute and infinite interlacement of vessels. This had been taken from a transverse section of the spleen of a boy of ten years, which had been kept in water forty-eight days. During this time, fresh water was pumped every second day on it, the mucous and colouring mat-

ter were entirely dissolved and discharged, the globular substance was washed out, and the arteries, to their most minute branches, became clear and distinct.

In drawing his inferences from these successive changes and appearances, we acknowledge our incapacity to discover what Sir E. Home makes of the cells themselves. He undoubtedly succeeds, so far as we can judge, in showing, that what they contain is lymph and mucus, or at least a fluid or semifluid, which is not organic; but this does not explain why these should appear to be contained in spaces or interstices of a cellular appearance and a globular figure. Suppose we do admit, for the sake of argument, that this something colourless was lymph and mucus, still the question recurs, Why should these substances distend or dilate these interstices or spaces, so as to give the cellular appearance?—and particularly, why should the individual parts in which the arterial branches terminate, be of this semblance and configuration.*

On the structure of this organ, an opinion, more palpable and definite in its nature, is given by M. Beclard, in the work to which we devoted the preceding article. This author refers it to what he has denominated, after Dupuytren and Richerand, the erectile tissue, a peculiar arrangement of arteries and veins which is found in the spongy texture of the corpus cavernosum, in that of the urethra, the clitoris, and the female nipple. It is somewhat unfortunate that the researches of anatomists on this erectile tissue have been restricted almost solely to the cavernous body of the penis; and it is rather by analogy, than very direct proof, that the similarity of structure is maintained.

The cavernous body was long supposed to be a part of a spongy nature, or consisting of innumerable cells separated by plates and fibres, which, at the moment of erection, were distended with blood poured from the arteries, and which was afterwards removed by some absorbing power of the veins. This opinion, which was that of Haller, and many subsequent anatomists, even Bichat himself, was derived apparently from the facility with which the blood so deposited escapes, not, as it was believed, from divided vessels, but from open areolæ. Modern researches, however, have shown this to be an erroneous opinion. Cuvier and Ribes in France, Mascagni, Paul Farnese, Moreschi in Italy, and Tiedemann in Germany, have shown that there were no cells, or spongiform structure, in the erectile tissue of the corpus cavernosum. If the arteries, on the one hand, be injected, they are found to terminate in very fine ramifications, the disposition of which is entirely the same as in

other parts; and if, on the other hand, the veins be injected, it is easy to perceive the two following circumstances:—1*st*, that they are much dilated at their origin; that is, that the venous *radiculæ* are really more dilated than might be anticipated from the other characters of these vessels; 2*d*, that the vascular dilatations to which they are accessory, form very numerous anastomoses, precisely as the capillary system of which they constitute a part. The effect of this arrangement is, to give these vessels the appearance of being penetrated with sieve-like openings, which makes them resemble areolæ, or meshes mutually communicating. As the whole difference, therefore, between the capillary vessels of this and other parts consists in the venous *radiculæ* being developed and dilated in a peculiar manner M. Beclard concludes, that the erectile tissue of the cavernous body consists simply of minute arteries and dilatable veins interwoven in the manner of capillary nets.

The spleen, M. B. thinks, may be said to resemble the cavernous body, both in structure and in phenomena; and he considers it as at once consisting of erectile tissue, and the seat of a species of erection more or less similar to that of the cavernous body. This viscus, he argues, presents an actual motion of expansion and contraction; and he adduces the three following circumstances under which this takes place. 1*st*, In experiments; when in a living animal, the course of the blood in the splenic vein is arrested, the spleen swells, but returns to its former dimensions as soon as the circulation is restored. 2*d*, In diseases; the paroxysms of intermittent fever are accompanied with an obvious enlargement of this organ, which subsides as soon as the paroxysm is over. 3*d*, It appears that the same phenomenon takes place during digestion. These reflections are certainly of considerable importance in showing, that the disposition of the splenic vessels may be of the same nature as that of the other erectile organs; and the lateral openings of the veins, which are noticed by Sir E. Home, are a strong confirmation of the correctness of the views which Beclard gives of the dilatation and frequent inosculation of the venous *radiculæ;* but it would be very desirable to examine it with the same care, and in the same manner in which this arrangement has been investigated in other parts, and in this manner to render the organization of the spleen as evident and certain as the nature of the subject will admit.

We now proceed to notice the opinions which Professors Tiedemann and Gmelin have lately published regarding the use of this organ. Of the sixteen experiments, which we formerly mentioned these physiologists had performed and repeated in various ways, the object of the four last, besides the illustration of the process of absorption in general, was, in a more particular

manner, to elucidate the actions and purposes of the spleen; and the conclusions to which our authors have come, as stated by themselves, are as follow.

1*st*, The spleen is an organ closely connected with the lymphatic system.*

2*d*, In it a coagulating fluid is secreted from the arterial blood, is taken up by the absorbents, and carried into the thoracic duct; and,

3*d*, This secreted fluid, when poured into the thoracic duct, is intended to make the chyle resemble the mass of blood.

I. That the spleen is intimately connected with the lymphatic system, may be inferred, according to our authors, from the circumstance of its being restricted to the four superior classes of animals; viz. the mammiferous animals, the birds, the amphibious class, and the fishes;—in which alone anatomical examinations have been able hitherto to prove the existence of the absorbent system. The size of the spleen, in the animals of these different classes, bears a certain proportion to the size of the body, and the degree of development and perfection of the absorbent system. In the mammiferous animals, which possess the greatest number of lymphatic glands, it is larger than in birds, in amphibia, or in fishes; in which, as the absorbent glands are either very few or entirely wanting, the absorbent system must be deemed less perfect and less fully developed.

The spleen is distinguished by possessing an extraordinary number of lymphatic vessels, which has been acknowledged by all the anatomists who have closely examined the absorbent system; particularly by Ruysch, Mascagni, Cruikshank, Hewson, and others. Some years ago Home asserted, very correctly, that the spleen had larger and more numerous absorbents than any other organ; and, with this opinion, the experiments of our authors are perfectly in unison.

The spleen has, even in its construction, a great resemblance to the lymphatic absorbent glands, inasmuch as, like these, it is formed by an intermixture of arteries, veins, and lymphatics, and has no other excretory ducts than the lymphatics themselves, which in it supply the place of such a duct. Ruysch† expressed a similar opinion as to the spleen, to which, as to the thyroid and renal glands, he applied the name of *Glandulæ Sanguineæ;* and

* We may here state, once for all, that MM. T. and G. uniformly employ the term absorbent (*saugader*), which we, to avoid any idea of function, have rendered merely lymphatic. The same remark is applicable to the lymphatic glands, which they uniformly call absorbent glands (*saugader-drusen*).

† Observat. Anat. Chirurgic. Centuria. Obs. 51. p. 48. Dubitandum non est, quin (glandulæ conglobatæ) exaltationi et ulteriori perfectioni lymphæ inserviant, aut succum peculiarem ex arterioso sanguine intra se conficiant, quam lymphæ impertiunt. Idem sentiendum de glandulis sanguineis, quæ sanguinis exaltationi et perfectioni inserviunt.

ascribed to them, as well as to the lymphatic glands, the function of secreting a fluid from the arterial blood, to mix with and perfect the lymph.

Hewson also* regarded the lymphatic glands, the spleen and the thymus, as organs which served to make the chyle and the lymph resemble one another, by mixing them with a fluid secreted from arterial blood, and which assisted in the formation of the globules of blood.

A more conclusive proof of the intimate relation between the spleen and the absorbent system, is derived by our authors from what they ascertained in the spleen of the turtle, in which, as in many of the amphibious animals, this organ is connected, not with the stomach, but with the intestinal canal. When the arteries and veins of this tube were filled with coloured wax, and the lacteals with quicksilver, all the absorbents of the small intestines were seen passing into the spleen; in which they formed inosculating nets, by being interwoven with the arteries and veins, and then continued their course in larger branches, like the carrying vessels of the absorbent glands, to the thoracic duct. Our authors therefore conclude, that the spleen of the turtle is entirely like a mesenteric gland, and probably has also the same functions.

II. The greatest peculiarity in the doctrines of our authors, is the opinion, that a fluid is secreted from the arterial blood in the spleen, taken up by the lymphatics, and conveyed into the thoracic duct. In confirmation of this, they adduce a phenomenon which they witnessed in the lymphatics of the spleen of horses, viz. the presence of a reddish fluid, which showed itself essentially different from the chyle of the lacteals, and also from the lymph of the absorbents of all other organs examined by them. Such a reddish coagulable lymph, they remark, was also observed by Hewson in the absorbents of the spleen, when he made his experiments. This author, it may be remembered, having extirpated the spleen of a living dog, after securing the blood-vessels, found the absorbents on the surface of the spleen filled with a reddish fluid, which, on being taken from one of the absorbents, and exposed to the air, immediately coagulated. In a bullock recently killed, he put a ligature on the splenic blood-vessels and lymphatics. The latter soon appeared filled with a reddish fluid, which resembled a mixture of red wine with water, and coagulated rapidly when taken from the vessels. Hewson repeated this experiment several times with similar results; and concluded from it, that the spleen was an organ in which the red globules of blood were formed, taken up by the absorbents, and poured into the thoracic duct.

* De Methodo, qua rubræ sanguinis particulæ formantur; Hewson Opus posthumum. Lugd. Bat. 1785. 8. Cap. 5. p. 94.

This opinion is rendered probable, they remark, if we advert to the relation which subsists between the spleen and its arteries. This organ, which, according to so many experiments, has no excretory channels, receives, in proportion to its size, a very large artery, which exceeds even the coronary of the stomach, or the hepatic artery; and which may be compared, in its calibre, to the arteries of the kidneys, or to those of an organ in which a copious secretion takes place. As the spleen receives a greater quantity of arterial blood than can be supposed requisite to its nutrition, and returns a proportional quantity of venous blood into the portal vein, they infer, that the organ must be the seat of some change, by which the arterial is converted into venous blood. From the analogy of other organs, they conclude, that so much blood, is not employed merely for the nourishment of so small an organ. This arrangement they explain by the inference, that there is secreted from the arterial blood of the splenic artery, a species of coagulable lymph of a reddish colour, which is absorbed by the lymphatics, and conveyed into the thoracic duct. This lymph, they remark, was seen not only by them, but by Hewson, in his experiments on living animals; and they conclude, that the formation of this fluid is the only means by which it is possible to account for the use of the great quantity of arterial blood which flows into the spleen.

It may naturally be asked, by what means the coagulable lymph, which is secreted from the arterial blood of the splenic artery, passes into the absorbents? And to this they reply—either there are, in the substance of this organ, particular gland-like bodies, and small spaces or cells, which several anatomists say they have remarked, in which the fluid is secreted, and taken up by the absorbents; or the finest branches of the arteries in the spleen pass immediately into the absorbents, and by this means some parts of the arterial blood reach the absorbents.

On the existence of cells, although the usual authorities are quoted, yet they place little reliance; and, in reference to what Sir E. Home formerly observed in the spleen of the ass, and considered as cells at the thick end and the border of the organ, they assert, that their experiment on the horse led them to regard these appearances as absorbents, which, after a full meal, are always filled with a reddish lymph.

Whatever may be the result of actual inspection, however, our authors remark, there is no doubt that fine fluids or air pass with great facility from the splenic artery into the absorbents. Besides the trials of this transit which were made long ago by Nuck, Bartholin, Cowper, Morgagni and Monro, they adduce the more recent experiments of C. H. Schmidt, who obtained the same results in operating on sheep and oxen. MM.

T. and G. themselves also found, that quicksilver, water or air, and fluids, in which cinnabar or chrome yellow were suspended, were made to pass through the splenic artery of horses, oxen, and calves recently killed, not only into the veins, but also into the lymphatics, and without producing any rupture of vessels which they could detect. From all these facts they infer, that a connexion subsists between the splenic arteries and absorbents, either directly, or indirectly, by means of cells.

This secretion, they further add, is under the influence of the nervous system of the ganglions.

The fact of the spleen being larger with an empty stomach, and less with a full one, which has been remarked by Lieutaud, Malacarne, Moreschi and others, though doubted by some physiologists, may be explained, according to the views of MM. Tiedemann and Gmelin, in this manner. The secretion of this reddish coagulating lymph from the arterial blood, takes place from the nerves being excited, particularly during digestion; and consequently, by the plentiful secretion, the course of the blood is carried forward in the spleen, which by this means is reduced in size. Even the observation of Sir E. Home, that the supposed cells of the spleen are filled with a liquid, particularly during the time of digestion, and appear, on the contrary, empty at other times, completely accords, they think, with their statement.

III. The third point which our authors have advanced, that this secreted coagulable lymph, when conveyed into the thoracic duct, is intended to render the chyle similar to the blood, requires naturally to be supported by at least two circumstances; 1*st*, that this change actually takes place;—in other words, that the chyle of the thoracic duct differs from the chyle of the mesenteric vessels, by a closer resemblance to perfect blood; 2*d*, that, when this coagulable matter was by any means prevented from reaching the thoracic duct, this change, did not take place. We shall see in what manner our authors establish these two circumstances.

They begin by showing, from the observations of many chemists and physiologists, that the chyle which is found in the intestinal chyliferous vessels, before passing through the mesenteric glands, is very different from that which is contained in the thoracic duct, or even in the chyliferous vessels above the mesenteric glands. They quote the authority of Reuss and Emmert, Vauquelin, Brande, Marcet and others, to show that the chyle taken from the thoracic duct has a reddish colour; that, when exposed to the air, it soon coagulates and separates into two parts, the serum and the crassamentum. Reuss and Emmert, who once took chyle from the absorbents of the intestinal canal of a horse, before passing through the mesenteric

glands, observed that it had not the least red, but a white colour, and that it coagulated much more slowly and imperfectly than the chyle of the thoracic duct. Our authors have repeatedly observed the same thing in the chyle taken from the absorbents of the intestinal canal, before they had passed through the mesenteric glands. The chyle of these vessels, which was always white, and had no tinge of red, either underwent no coagulation, or did so very feebly and slowly. But that which they observed in the absorbents which had passed out of the mesenteric glands was reddish, and coagulated more easily and more firmly than the other. The chyle in the thoracic duct, above the entrance of the splenic absorbents, and after being mixed with the reddish coagulable lymph, appeared reddest, and coagulated very rapidly. The gradual transformation of chyle into blood, they argue, is therefore a consequence of its passage through the mesenteric glands, and of the mixture of the reddish coagulable lymph supplied by the absorbents of the spleen.

The properties of the spleen in the fœtus, and in old age, support this view. In the fœtus, the spleen is well known to be very small; and no chyle is formed in the intestinal canal in this stage of existence; the spleen accordingly, intended to assimilate the alimentary matter derived from the intestinal canal, is of no importance. After birth, when the formation of chyle begins, this organ shows itself full of blood, and increases in size rapidly. In old persons, they have commonly found the spleen diminished; it appears, therefore, like the lymphatic glands, to decrease in size with age.

To establish the second circumstance, it was requisite to prevent the coagulable lymph either from being formed, or from being conveyed to the thoracic duct. This was most easily accomplished, by extirpating the spleen from an animal, and seeing, whether, in truth, this change did or did not take place, or whether the want of the splenic coagulable fluid had any influence on the properties of the chyle in the thoracic duct. By an incision, therefore, under the false ribs, our experimentalists extracted the spleen, and, having tied the splenic blood-vessels, separated the organ from its other connexions. A portion of the great omentum, with several folds of intestine which had been protruded during inspiration, being replaced in the abdominal cavity, the edges of the wound were brought together and united by suture.

On the day of the operation, and also on the following day, the animal was melancholy, lay on his left side, ate and drank nothing, passed his urine only once, and had no intestinal evacuation. On the third day, the edges of the wound were much swelled and inflamed; the heat of the body was increased, and

the nose dry. The dog left his couch occasionally, took some milk and moistened bread, and passed his urine once. On the fourth day, when matter was formed at the edges of the wound, the animal eat and drank a little, passed his urine occasionally, and some hard dark brown excrement for the first time. On the fifth day, the secretion of matter being increased, the dog took some nourishment, passed his urine, but no excrement. On the sixth day, he was again tolerably cheerful, and ran about the room; florid granulations formed on the wound; and hard brown excrement was voided. On the following day, the granulations continued to form, the ligatures fell off, and the wound began to heal. The dog recovered his cheerfulness, eat and drank as usual; the quantity of urine was not increased, and the excrement had its proper qualities. On the eighteenth day after the operation, the wound was perfectly united and cicatrized; and the animal appeared, except being a little emaciated, quite as well as before the operation. He took no more food than formerly, passed his urine as usual, and the excrement of the rectum was of a proper consistency and brown colour.

In order to examine the chyle in the thoracic duct, it was requisite to kill the dog. At half past 12 o'clock at noon, two drachms of prussiat of potass were given him in a mixture of bread and milk,—a combination which he devoured voraciously; and the urine, an hour after, showed, by adding muriat of iron, the presence of the salt. At 4 o'clock, the animal was killed by strangulation. The chest was immediately opened, and the thoracic duct tied. When it was pierced, it discharged a clear white-like thin fluid chyle, which was received in a vessel. As it cooled, a very small portion of crassamentum formed itself, which swam in the abundant serum, and first acquired, after being long exposed to the action of the air, a pale red colour. Our authors never observed, in their prior experiments, so small a quantity of crassamentum. On pouring a few drops of muriat of iron into the serum of the chyle, a pale greenish blue colour arose, which might be occasioned by the presence of the prussiat of potass.

On opening the abdomen, the omentum was found adhering to the muscular peritoneum, where the wound was made, by which the spleen was extracted. The liver was full of blood, and appeared even to be somewhat enlarged. The gall-bladder was filled entirely with bile, which had the usual brownish green colour, and was of the same consistency, and as bitter as it commonly is. Some prussiat of potass was detected in the bile. The serum of the blood taken from the portal vein was coloured blue, on the addition of muriat of iron.

The stomach contained a white sort of pap of bread and milk.

In the yellow gall-coloured contents of the small intestines, they perceived several flakes of chyle. Prussiat of potass was found in the stomach, and in the whole intestinal canal.

On examining the lymphatic glands of the abdomen, the mesenteric glands were found unusually large, and full of blood. The absorbent glands in the region of the lumbar vertebræ and the pelvis, were evidently increased in size. Finally, it deserves to be mentioned, that in the uterine extremity of the fallopian tubes, five embryos were found, which might be about four or five weeks old.

On comparing this case with the experiments made by others on the extraction of the spleen, Messrs. Tiedemann and Gmelin give the following as the results.

"1. The increased secretion of the urine observed by Malpighi, Bohn, Brunner, Vallisneri, Heister, Ortlob, Deisch, C. A. Mayer,* and Schmidt,† after the extraction of the spleen, is not essentially derived from it, as it did not take place in our experiment.

"2. The violent appetite remarked by Malpighi, Dupuytren, and others, is also not a necessary consequence, as it did not exist in our dog.

"3. Mead and Mayer assert, that animals from which they had extracted the spleen digested ill. We, however, did not observe any appearance of enfeebled digestion.

"4. A cat, from which Mayer had extracted the spleen, always passed fluid excrement. The excrement, in our experiment, was always hard.

"5. Ortlob says, he found the gall not so yellow as usual, and watery. Bohn, Vallisneri, Pozzi, Buonazzuoli, Morgagni, perceived it to be very bitter, and dark coloured. We have not discovered any difference in the gall, either as to its quantity, colour, or bitterness.

"6. Mayer mentions, that the mesenteric glands, and the absorbent glands of the abdomen, of the chest, and of the neck, in a cat, were much enlarged. In our experiment, we perceived at least an enlargement of the absorbent glands of the abdomen.

"7. The properties of the chyle in the thoracic duct, have not been attended to by any experimentalist. As it appeared so uncommonly thinly-fluid and white, and contained so small a quantity of crassamentum or coagulable matter in our experiments, it implies a confirmation of our opinion, that, in the spleen, a red coagulable lymph is secreted from the arterial blood, and conducted into the thoracic duct, to assist in converting the chyle into blood. Its watery nature, and the appearance of so small a quantity of crassamentum, must be regarded as the consequence of taking away the spleen.

"8. Our experiment agrees with the results obtained by other physiologists who have extracted the spleen, in so far as they have shown that it is an organ not essential to the continuance of life. The cause

* Salzburgen Medizinisch-chirurg. Zeitung. 1815. B. 3. § 189.
† Commentatio de Pathologia lienis. Gotting. 1816. P. 49.

of this is, probably, that the other lymphatic (*absorbent*) glands, which perform the same functions as the spleen, may supply its place by an increased activity. Mayer, as well as we, saw the lymphatic glands of the mesentery and of the abdomen enlarged,—an event which supports this opinion; and probably an increased secretion of coagulable lymph took place in them."

They conclude by observing, that pathology furnishes several confirmations of their opinion; and they adduce the instances of scrofula, diseases of the chylopoietic viscera in general, intermittent fever, and abdominal dropsy.

In stating the preceding details of the researches and inferences of our authors, we have refrained from expressing any sentiment of our own. The inquiry is at once so intricate, and the precise facts are so difficult to ascertain, and so liable to various causes of error, that it is not easy to employ them in analytical examination, or for the purpose of induction; and we think it best to place the information before our readers, as nearly as possible in the state in which we obtain it. Every one will be thus enabled to estimate, in some degree, the value of what is ascertained, the consistency of the individual parts with each other, and the merit of the whole; while it may enable future inquirers to distinguish the ambiguous points, and suggest the means either of ascertaining, or proving them to be entirely hypothetical and fallacious.

It is obvious, however, that the doctrine of the German physiologists has the advantage of the other two in the perfection of its parts, and in the elaborate and finished manner in which it has been presented to the world. Neither Sir Everard Home states why the lymph globules and mucus should be conveyed into the spleen, during or towards the close of the process of chylification, or for what purpose they are made to perform this route; nor does M. Beclard show what is the use or object of the erectile action of the spleen; or in what manner, when it does occur, it contributes to any purpose in the economy. These objections do not apply to the notions of Tiedemann and Gmelin, who not only inform us that their reddish coagulable lymph is prepared in the spleen, but that it is further employed in the elaboration and perfection of the chyle, previous to its union with the blood; and that, without the influence of this agent, the chyle is defective in some of its more prominent and necessary properties. It is impossible indeed, in taking leave of this complicated subject, to refrain from admiring the great ingenuity displayed in the inferences which our authors draw from the facts and observations of their predecessors, and the happy manner in which they render them conclusive in relation to their own doctrines,—as well as the precision of their reasonings, and the application of their experiment, in support of the

third proposition. The only possible objection which may be urged against this, is the individual case, which is perhaps not sufficiently strong to remove the doubts, and satisfy the curiosity of all. And if on repeating this experiment, the results were found to be uniform, it would undoubtedly require a great deal more observation and reasoning than we have yet seen, or know of, to overthrow, or even weaken, the doctrine which the German Professors have advanced.

In the concluding pages of their memoir, MM. Tiedemann and Gmelin give the results of their experiments, as they apply to the question of the existence of secret urinary passages. In the course of their researches on the function of absorption, they had occasion to remark the influence of three classes of substances on the properties either of the blood in general, or of the urine in particular. For the sake of brevity, we give a tabular view of these results.

I. *Odorous Substances employed.*

Spirit of turpentine found in the urine of the dog and horse.

Camphor, Musk, Dippel's oil, Spirit of wine, Garlic, } found in the blood of the mesenteric and portal veins. { Not found in the urine, but communicated to the air expired from the lungs.

II. *Colouring Matters.*

Rhubarb—urine of dog
Indigo—urine of horse } blood of portal veins—not in chyle.
Gamboge—urine of horse.

Litmus tincture, Cochineal, Alkanet, Sap-green, } Did not change the colour of the urine, nor were they recognised in it by chemical tests;—appear to be destroyed in the stomach and intestines.

III. *Saline and Metallic Substances.*

Prussiat of potass
Sulphuro-prussiat of potass } found in the urine and chyle of the dog.

Iron, Baryta, } found in urine and blood of portal veins of the horse—not in the chyle.

Lead, Quicksilver, } not found in the urine.

The conclusions which our authors deduce from these facts, are of two kinds,—one relating to the accuracy of former researches and to their application, the other relating entirely to their own researches.

They consider the inference which Dr. Erasmus Darwin drew from his observation of the effects of nitre on the blood and urine of his patient as unwarranted, and the means which he employed to demonstrate the presence of the nitre, as too vague and inaccurate. In reference to the experiments of Drs. Wollaston and Marcet and Mr. Brande with the prussiat of potass, in which the salt was recognised in the urine, but not in the

serum of the blood, or that obtained by vesication;—they remark, that as the prussiat of potass given was mingled with the whole mass of the blood, the quantity in individual portions of this was too small to admit of its being detected; and that this salt, like many other substances which pass into the circulating fluid, is very speedily discharged by the excreting organs. According to the experiments of Home, Magendie and Mayer, therefore, which have been confirmed by our authors, the opinion entertained by these eminent chemists is totally without proof or foundation.

The opinion of Darwin, Thilow, and some other physiologists who sought to explain these phenomena by a retrograde motion of the fluids in the absorbents, they consider as entirely irrational,—as contradicted anatomically by the existence of the valves, and physiologically by the results of their eleventh experiment. In this they found the urine of a horse, to which they had given a considerable quantity of the tincture of indigo, of an intense greenish blue colour; and they recognised the same tinge in the ureters, pelvis, and infundibula of the kidneys. If this substance, they observe, had been removed by the lymphatics of the stomach and intestines, and had been conveyed by a retrograde motion of the lymphatics of the urinary organs into the infundibula of the kidneys, the absorbents must have contained a greenish blue fluid, because a considerable quantity of the tincture was found in the stomach and intestines. This, however, was not the case; for the intestinal absorbents contained chyle not of a blue colour; and in those of the kidneys, bladder, and whole lumbar region, they found a clear transparent lymph of a faint yellow tinge, as is commonly observed.

MM. Tiedemann and Gmelin view, in the same light nearly, the opinion of G. R. Treviranus,* who had recourse to the cellular membrane of the stomach, intestinal canal, and urinary organs, to explain these rapid transferences of fluid. Though all the fluids contained in the stomach and intestinal canal were tinged either blue or yellow, yet the serum of the cellular membrane of the lumbar and renal regions, gave no trace of any change.

Our authors therefore infer, that the supposed secret and direct communication between the stomach or intestines, and the urinary organs, is a mere fiction; and no method of explaining the phenomenon is left, but that, in such circumstances, the matters employed are carried not through the thoracic duct, but directly by the veins into the circulating fluid, whence they are deposited in the kidneys.

* Biologie, B. 4. s. 516.

Medico-Chirurgical Transactions. Vol. II. Part 2, with Plates.

(From the Medico-Chirurgical Review, for March 1822.)

Were we to say that the volume before us is equal, in interest or importance, to its earlier predecessors, we should certainly have the character of our judgment or veracity suspected. And as we do not deem it necessary to sacrifice this character for the sake of complimenting a public body, (which neither needs nor cares for compliments,) we shall candidly confess, that our disappointment and regret have, for some time, been excited by the "falling off" of transactions which, at one period, commanded the respect and called forth the admiration of Europe and America. It is perhaps needless to inquire into the cause or causes of this decadence, since we perceive it to be an inherent principle in every human institution or production, whether of the head or the hand. Is it very astonishing, then, that the periodical transactions of the Medico-Chirurgical Society should bow to that universal mandate of Nature which declares that—

> The seas shall waste, the skies in smoke decay,
> Rocks fall to dust, and mountains melt away?

It would be much more astonishing, indeed, if these transactions presented an exception which would be the only one in the annals of the world—and in nothing more strange than in the records of periodical publications on medicine.

As a bright side to this sombre picture we are happy to be able to state that, while the papers read at the Medico-Chirurgical Society have declined in value, the Society itself has risen and is still rising in numbers, respectability, and influence. It is also gratifying to add that, while the communications are not unfrequently of an inferior character, the discussions arising out of them very often assume the highest interest and importance.

We have one remark to add, before we proceed to our analytical labours. We imagine that the Society would do well to imitate the conduct of many societies on the Continent, by publishing *abstracts* of those papers which cannot be admitted, in their original forms, into the transactions. Many important hints and valuable facts would then be preserved for the profession at large,—nor do we believe that the writers of these papers would feel displeased at the publication of their communications in a condensed form—on the contrary, we imagine they would prefer this to their entire suppression.

We shall make a point of giving, in future, a regular and

rather detailed account of all papers appearing in these transactions; and we hope that on this, as on every other occasion, we shall carefully abstain from mixing private feelings (however they may be excited) with public duties—a practice dangerous to the writer, affronting to the reader, and inimical to the interests of a liberal and enlightened profession.

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I. *Cases of Bronchocele or Goitre, treated by Seton, with Observations, by* A. P. Copland Hutchison, Esq.

In the tenth vol. of the Medico-Chirurgical Transactions Dr. Quadri published a paper on the Treatment of Bronchocele by Setons, which induced Mr. Hutchison to adopt the practice. The case, which he selected for experiment, occurred in a woman, who had first perceived the disease thirteen years before. It appeared a few days after labour, which we have found a frequent cause of it, by producing a retardation in the reflux of the blood, and a consequent enlargement of the vessels of the neck. The tumour was of the size of an orange, and of rather a firm and hard structure. Mr. H. passed a long and narrow seton-needle armed with half a skein of silk-thread, obliquely through the substance of the gland, from the left lobe upwards, that being more enlarged, leaving a space of nearly two inches between the entrance and escape of the instrument. The trachea being pushed backwards upon the œsophagus, the trunks of the thyroid arteries escaped the needle, which, it must be observed, was carried through the gland midway between the integuments and the wind-pipe. No hæmorrhage of importance followed. At the end of a few days an erysipelas appeared, which was followed by a profuse discharge of thin acrid matter. The discharge from the wound was kept up by the occasional application of sabine-ointment; and at the end of three months the seton was removed, and another introduced from the lower part of the right lobe of the gland, so as to cross the course of the former. The latter seton having remained in its situation during two months, accidentally escaped; but it was not deemed necessary to replace it, as the discharge from and gradual reduction of the tumour continued afterwards to proceed in a favourable manner. A slight oozing of kind pus having been thus spontaneously supported for several months, about twelve from the time of the operation it subsided, and the disease was scarcely perceptible.

The seton seems to be better adapted to the soft and yielding species of bronchocele, than to that which is firmly indurated and lobulated. In the former, Mr. Hutchison says that the operator may boldly pass the instrument throughout the substance of the morbid mass with perfect safety. In the latter, it might be more prudent to perforate a smaller portion of the gland, and to repeat the operation on different parts of it in succession, in order to guard against inflammation in the mucous membrane of the trachea.

The deformity succeeding the cure has been found to disappear in great measure in a few months.

It has been asserted by Mr. Nerman, a student from Sweden, that in Denmark it is a common practice to make incisions into the sub-

stance of the diseased gland, and that bronchocele is thus frequently cured; but we are not informed whether the suppurative process is afterwards established or not. This disease has also been successfully treated by Dr. Coindet of Geneva, with solution or tincture of iodine; and Dr. Straub, of Hofwyl asserts, that this medicine may be advantageously used in all cases in which burnt sponge has been employed.

To the above case, in which the seton was employed, Mr. Hutchison adds one by Mr. Gunning, surgeon to St. George's Hospital, three by Mr. A. T. Thompson, and one by Mr. James, of the Devon and Exeter Hospital. In Mr. Gunning's case, eight days after the operation, the seton was removed, the parts contiguous to it being in a sloughing state; and a few days after the separation of the sloughs, the patient's health having gradually declined, she died after one of the severe attacks of tracheal irritation, to which she had been subject. The remaining portion of the thyroid gland was in a sloughing condition, and some slight streaks of inflammation were discovered in the lining membrane of the trachea after death.

In the first of Mr. Thompson's cases the operation was successful. A considerable discharge of blood followed immediately, and a slight one continued during two or three days. The seton was removed at the end of two months. The result of the practice in the second experiment was not known. The third case occurred in a man, aged sixty-one. The swelling was of the soft kind. The seton was withdrawn in three weeks, the tumour being greatly reduced.

Mr. Thompson was partly induced to try the effects of the seton, having witnessed the cure of a very large bronchocele by the application of a caustic, which occasioned the whole of the diseased gland to separate at the end of five months.

Mr. James's case was a most interesting one. The patient, a man aged 35, had received the best assistance which could be afforded him, without experiencing any benefit. The tumour was firm and elastic, and of the size of a large flattened orange. The progressive increase of it and the accompanying symptoms threatened his destruction. The seton was introduced through the centre of the swelling from the upper to the lower part. The next day, the obstruction returning and the face being flushed, he was bled and purged. The dyspnœa increasing, attended with distressing cough, suppression of the voice as in laryngitis, copious expectoration, haggard countenance, and a frequent, small, and weak pulse, the seton was taken out about ten days after the operation. At this time the patient expectorated transparent firm lymph, having the appearance of membrane; and the same substance could be extracted from the ulcerated orifices. An expectoration of puriform mucus was present, attended with orthopnœa. In less than two months the tumour entirely disappeared.

The practice of curing bronchocele by the seton, which was introduced by Foderé and others nearly half a century ago, appears until lately to have fallen into disuse. The attempts to revive it, which we have just detailed, have been sufficiently fortunate to justify us in recommending its adoption in all cases, in which the tumour is soft,

and in others, where the symptoms portend a speedy dissolution, and the usual means have been found ineffectual. In young persons the operation will seldom be found requisite, because the sponge will in them usually effect a cure, and we have frequently observed the disease to disappear spontaneously before puberty. After this period, medicine is seldom of any avail, and our chief hope must rest upon local measures.

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II. *Observations on the Scrofulous Inflammation of the Peritoneum occurring in Children, and frequently denominated Marasmus.* By George Gregory, M. D. Senior Physician of the St. George's and St. James's Dispensary.

Dr. Gregory thinks he has been able to distinguish three different states of abdominal disease in children, which have, as a common character, fever of a slow remitting kind, and emaciation.

"The *first* of these consists in simple disturbance of the functions of the intestinal canal without organic derangement." P. 261.

This, according to Dr. Pemberton, may prove fatal without inducing inflammation or ulceration within the abdomen, and constitutes the most common form of infantile remittent fever.

"The *second* form of marasmus is that in which the mucous membrane of the bowels is extensively implicated. After death ulcerations both of the great and small intestines are observed, with more or less enlargement of the mesenteric glands, and sometimes, though rarely, ulceration of them." 262.

In many instances Dr. Gregory presumes that this species is secondary, having been preceded by the one, which is found only to disturb the functions of the bowels.

The *third* form of marasmus is that to which Dr. G. wishes most particularly to attract our notice. He is induced to believe that it is primarily a disease of the peritonæum, and calls it the *scrofulous inflammation* of that membrane; on account of its being usually met with in scrofulous children. Disease of the mesenteric glands has not escaped his observation; but having always seen it complicated with, or probably resulting from, a morbid state of the mucous or serous membrane of the abdomen, he views it in a subordinate light.

Symptoms. Gradually increasing tenderness of the abdomen, soon followed by paroxysms of acute pain, which grows more frequent and violent, and spreads from one part over the whole of the abdomen. The belly is at first enlarged and tense, and we have seen it completely tympanitic; but, as the disease advances, the swelling abates or subsides altogether, and is seldom perceptible after death. The pulse about 100; tongue generally clean; appetite irregular; thirst; intestinal discharges frequent, at first slimy and afterwards consisting of a whitish brown matter, and greatly exceeding in quantity the medicine and other ingesta. Emaciation, and in four or five months diarrhœa and petechiæ, which in three or four days destroy the patient. Strangury is a common symptom, and in several instances we

have satisfactorily ascertained that there have existed a periodical increase of pain and a febrile exacerbation, for the most part after midnight.

Necrotomy. Dr. G.'s description of the morbid appearances on dissection exactly correspond with those, which we have ourselves witnessed.

"On cutting through the parietes of the abdomen, all trace of abdominal cavity will be wanting. The mesentery, bowels, and peritonæum lining the parietes, will be found united together into one mass. The peritonæum, in all its duplicatures, appears thickened; and, on cutting through the diseased mass, very large quantities of scrofulous matter will be found. The mucous membrane of the bowels, particularly (of) the small intestines, appears ulcerated in various places, and at these points of ulceration the convolutions of the intestines communicate, so that, instead of forming one line of canal, as they will continue to do even in advanced stages of common chronic peritonitis, they constitute a mass of tubes communicating freely with each other, and with the thickened and ulcerated peritonæal membrane by innumerable openings. The matter, which will be found both within and without the mucous membrane, will be observed to correspond exactly with that which was passing during life by stool." 266.

Treatment. Little impression having been produced on the disease by any medical treatment, Dr. G. has enumerated only a few remedies, and on these he appears to place no reliance. When laudanum becomes necessary in the latter period of the malady, he has not found it to produce constipation.

Diagnosis. Abdominal tenderness and paroxysms of pain, followed by the discharge of large quantities of thick white matter by stool, are considered by Dr. G. sufficient peculiarities to distinguish the scrofulous peritonæal inflammation from the other species of marasmus.

Dr. Gregory proposes to offer to the Society, on some future occasion, observations respecting hydrocephalus, when we will add his farther experience in the different species of marasmus. We shall be happy to give extended publicity to Dr. Gregory's remarks at all times.

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III. *Case of Fractured Os Pubis successfully treated.* By Henry Coates, Esq. Surgeon to the Salisbury Infirmary.

The accident was occasioned by three persons falling with great force upon a woman from a coach, which was overturned. The fracture was readily discovered at the juncture of the ramus of the pubis with the ischium. The bladder, rectum, and the extremities retained their sensibility.

Mr. Coates procured a bandage of wide, woollen girth-web. This was drawn under the pelvis, and, by means of buckles and straps placed near together, was secured as tightly as the patient could bear. Two straps were attached to the back part of this belt, brought be-

tween the thighs, and fastened in front; and pads were placed on each side the pubis. Bleedings, aperient and saline medicines were had recourse to, and at the end of five or six weeks the patient was able to walk without assistance, and recovered.

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IV. *Case of Sudden Death, in which a Hydatid was found in the Substance of the Heart.* By David Price, Esq. London.

The boy, who was the subject of this case, was ten years old. He fell down suddenly and unexpectedly, and in a few minutes expired.

The contents of the cranium and of the abdomen were found perfectly healthy. A portion of the pericardium adhered to the heart, and in the muscular substance of the latter was discovered a large hydatid. Two ounces of dark coloured fluid were floating in the pericardium.

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V. *A Case of Aneurism of the Carotid Artery.* By Henry Coates, Esq. Surgeon to the Salisbury Infirmary.

The aneurismal tumour was seated in the left carotid, and measured five inches and a half in length, and four in depth. The patient, aged 41, was first a sawyer, afterwards a dragoon, and, lastly, a labourer in husbandry. This disease extended beyond the mastoid process, in part concealing the ear, and covering the edge of the inferior maxilla almost to the chin, where it became conical. The pulsation was strong, and ulceration had begun. The man complained of headache, had a slight cough, was confined to bed, had dyspnœa and dysphagia, and expectorated daily nearly three pints of mucus. The pupil of the left eye was contracted, and vision imperfect. He spoke indistinctly. The pulse 90.

Digitalis and venesection having been tried in vain, the operation of applying a ligature on the artery was deemed expedient. Only one ligature was employed, and the wound was drawn together with adhesive plaster. The patient became faint, and continued so for some minutes.

The next day the pulse having become hard and quick, he was bled from a large orifice, and other symptoms were relieved by aperients and sudorifics, and by opiates at bed time; and about the eighth day the aneurismal mass had subsided to half its pristine size, and the contracted pupil had nearly recovered its natural dilatation and sensibility. On the 33d day the tumour was much enlarged and tender, and a blush of inflammation appeared on both sides of the neck, attended with much pain in the throat. The 34th day, the pulse being hard, venesection both local and general was had recourse to, and a fluctuation being evident, an opening was made, which gave vent to seven ounces of offensive blood and pus. On the 55th day six ounces of florid blood were suddenly discharged from the aneurismal sac, after which the hæmorrhage spontaneously ceased; and the pulse remaining hard, bleeding from the arm was again repeated. The tonsils were then inflamed. From this to the 63d day hæmorrhage repeatedly appeared; and about the 67th day

the patient fell into a state of collapse with dysphagia, singultus, and anxiety, and in the evening expired.

Necrotomy. The ligature had been applied to the artery at the distance of an inch and a half from its origin. The vessel itself was impervious for the space of an inch. An artery, which admitted a probe, was discovered extending from the lower jaw into the sac. The back part of the aneurismal bag adhered to the bodies of four of the vertebræ.

Mr. Coates is inclined to believe that the event of this case might have been more fortunate, had the contents of the tumour been evacuated by art, before the inflammation had made its appearance.

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VI. *Case of Malformation of the Heart.* By George Gregory, M. D. Senior Physician to the St. George's and St. James's Dispensary.

The patient was from birth of a blue colour, thin, and subject to constant dyspnœa; and at the age of eighteen years he died of pulmonary consumption.

The preternatural appearances in the heart were the following: the aorta and pulmonary artery arose from the right ventricle; the septum ventriculorum was deficient at its base; the opening in the septum corresponded exactly with the situation of the aorta at its origin, and affected a communication between the ventricles; the pulmonary artery was but little smaller than usual.

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VII. *A Case of Chorea successfully treated by Arsenic.* By George Gregory, M. D. Senior Physician to the St. George's and St. James's Dispensary.

The species of chorea, for which arsenic has been successfully exhibited, is *said to be* unaccompanied with disorder in the stomach and bowels.

Dr. Gregory's patient was seven years old, and had suffered with the disease above six weeks. Several remedies had been tried in vain. She appears to have taken liquor arsenicalis about sixteen days, beginning with three drops, and gradually increasing the dose to seven or eight. The medicine twice produced sickness and was suspended, and in about three weeks the girl was discharged cured.

For the use of so active a medicine as arsenic, we are astonished that minims are not preferred by Dr. G. to drops, which vary according to the size and shape of the aperture through which they pass. Indeed on all occasions we think the minim-measure ought to supersede the use of drops.

We have seen several cases of chorea, in which the digestive organs have not appeared to be affected, but, after a careful examination of the intestinal discharges, we have found reason to believe that the liver has been torpid: the fæces having been well formed, but not exhibiting that complexion, which is the result of a due admixture of healthy bile. Whether the hepatic disorder may have been primary or secondary, we cannot determine; but we have, in

these cases, observed such a debility in the mental powers, as to occasion temporary idiotism. Both the mental and physical infirmities have however always been removed by the exhibition of a grain or two of calomel, repeated twice or three times a day, until the stools have a natural aspect, and the circulation, which was before slow and interrupted, has been accelerated for a sufficient length of time to insure a wholesome energy in the viscera, which were oppressed.

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VIII. *On the Efficacy of the Bark of the Pomegranate Tree in Cases of Tænia.* By P. Breton, Esq. Surgeon to the Rhamgur-Battalion in the East Indies.

Eight cases of tænia are related, in four of which a decoction of pomegranate was employed, and in the others the powder, with equally good effect. The decoction was prepared by boiling two ounces of the dried bark in a pint and a half of water, until it was reduced to twelve ounces. Of this two ounces were given every half hour, until four or five doses were consumed; when vertigo, sickness, and uneasiness in the bowels commenced. The medicine was then suspended, and at some time within twelve hours the worm was expelled. The powder was administered in the dose of a scruple to a boy, and two scruples to an adult, every half hour, for five or six times, when the same symptoms and effects resulted, as when the decoction was exhibited.

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IX. *On the Efficacy of the Bark of the Swietenia Febrifuga, as a Substitute for that of the Cinchona.* By P. Breton, Esq.

From the resemblance of the extract of the swietenia to gum kino, and the predominance of its astringent quality, it is probable that its effects will be found analogous to those of any other vegetable astringent. The cases which are brought forward, and the praises bestowed upon it, by no means satisfy us that it possesses any specific property in the cure of disease, besides what might be expected to result from its astringency. The pathology of fever is now so much better understood, than it was when cinchona was first introduced, that few modern practitioners will, we apprehend, be solicitous to obtain any substitute for a medicine which is likely soon to be nearly exploded.

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X. *On the Physiology of the Ear.* By Joseph Swan, Esq. Lincoln.

The Medico-Chirurgical Society some time ago published a paper of Mr. Swan's respecting the physiology and pathology of the ear, in which he presumed that people born deaf and dumb, and who had no defect in the auditory nerves, might be made to hear through the medium of the facial nerves, and thus have their unfortunate situation amended. To substantiate this opinion, he has in the present volume adduced a case, in which the external passage to the ear was imperforate, and sounds were heard through the nerves on the face. The person can also speak intelligibly.

Mr. Swan thinks that the reason why those who are born deaf are not more frequently able to acquire a degree of perfection in hearing, is because their whole attention is apt to be taken up with signs, and no methods have been generally used to increase the power of the provision usually made by Nature for supplying the defects occasioned by imperfections of the tympanum.

"Presuming that what I have said is well founded, it is not reasonable to expect that the powers of the facial nerves should ever be fully developed in dumb children, if their instructers do not direct the whole, or by far the greater part of their attention to the proper exercise of these nerves. And if this is to be done effectually, it must probably first be by the assistance of instruments, to increase the effect of sound; and when these have been properly used, and have answered the intended purpose, then by gradually lessening their power until common sounds can be heard." 336.

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XI. *Case of Amputation of Part of the Tarsus and Metatarsus, and Preservation of the Shape and Usefulness of the Foot.* By John Dunn, Esq. Scarborough.

A boy had suffered more than two years with caries in the bones of the tarsus attended with hectic fever. A tourniquet being applied to the thigh, Mr. Dunn cut through the extensor-tendons of the foot, and removed the os cuboides and the external cuneiform bone. No serious hæmorrhage followed. An improvement having taken place in the boy's health, about three weeks afterwards the two other cuneiform bones, and the os naviculare were dissected out, and the diseased tarsal ends of the metatarsal bones of the second and third inner toes were sawed off. A profuse hæmorrhage and syncope followed. A part of the astragalus in front being diseased, was scraped away, and the hæmorrhage was restrained by dry lint and a roller. On the third day after this second operation, the bleeding returned, and the wounded vessel was secured. Sinuses made their appearance, but the foot was quite healed in two months by means of adhesive straps. The boy now walks without any pain or apparent lameness, and the natural appearance of the foot is but little altered, excepting that it is an inch and a half shorter than the other.

Remarks on this case are subjoined by Mr. Copland Hutchison, in which he mentions an instance, where he removed several bones from the tarsus, after which his patient recovered with the use of his foot.

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XII. *An Account of a Case in which numerous Calculi were extracted from the Urinary Bladder, without the Employment of Cutting Instruments.* By Sir Astley Cooper, Bart. F. R. S.

"When a great number of calculi are found in the bladder, as was the case in the Rev. Mr. Bullen, the circumstance is generally attended with an enlargement of the prostate gland, and it depends upon a sacculus being formed in the bladder directly behind the enlarged gland. In these cases the bladder is rarely completely

emptied of its contents, and the calculi crystallize from the urine retained in this sac.

"Such stones do not in general acquire the magnitude of those formed under the usual circumstances, and, from their number and collision against each other, their surfaces are generally smooth, and their shape is commonly rounded." 357, 358.

"When calculi are thus placed, they are so concealed in the bag, in which they are contained, that, in sounding, the instrument is liable to pass over them without their being discovered, and it is therefore necessary to dip the point of the sound towards the rectum as it enters the bladder, in order to detect them, or to pass the finger into that intestine, to raise them from the bed in which they are concealed; and it is for want of attention to this circumstance that I have known a person pronounced not to have the stone, from whom I afterwards removed thirty-seven by the operation of lithotomy." P. 358.

The instrument, which Sir Astley made use of in the case, which he has published, was in the shape of a sound, consisting of two blades, that acted like a pair of forceps in grasping the stones.

"Mr. Bullen was placed across his bed, with his feet resting on the floor, and a silver catheter was then introduced, and the bladder emptied of its urine. I then passed the forceps into the bladder, and was so fortunate in my first operation as to extract eight calculi.

"The instrument gave but little pain on its introduction, but when opened to its greatest extent, and the stones admitted between its blades, their removal was painful, more especially at the glans penis, which appears to be the portion of the urethra which furnishes the greatest resistance to the removal of the stones." 359.

A dose of opium was given after each operation, which was repeated seven times before the calculi were all removed.

We have had opportunities of seeing this distinguished surgeon make use of this instrument, which appears an admirable invention, and perhaps capable of still farther improvement.

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XIII. *On Sloughing Phagedæna.* By Richard Wilbank, Esq.

Mr. Wilbank has generally noticed this disease in the lowest class of prostitutes. It begins in the form of an irritable boil, elevated and surrounded by a dusky inflammation, seated generally in the clift of the nates, in the groin or upper part of the thigh. The apex of the boil vesicates, and bursting exposes a stratum of adherent straw coloured flocculi, with a viscid secretion resembling pus, which is interspersed with darker points of a brown or grey tint. The surface enlarging, the centre becomes depressed, and the oval or circular sore is surrounded by a circumscribed thickening and an increasing halo of dark inflammation. From the darker points of the ulcer hæmorrhage occurs at times, and a peculiar fetid odour is observable. As the putrescence of the slough advances, much foul secretion appears, and shreds of pulpy matter are detached by the removal of the dressings. The sloughs are grey or dark brown. The pain be-

comes constant and agonizing, and the patient is found lying on her back with the thighs separated and bent upwards. The disease now spreads with rapid strides and is highly contagious. At length the constitution participates in the mischief which is going on: restlessness, loss of appetite, furred tongue, anxiety, pains in various parts of the head, accelerated pulse, hot skin, thirst, bilious vomiting and purging present themselves. Delirium rarely supervenes.

Treatment. Mercury has been constantly found exceedingly hurtful. Bleeding, particularly in plethoric habits, is proper in the early stage; but leeches are objectionable on account of the tendency of their bites to assume the morbid action of the adjoining parts. Large doses of opium at regular intervals are serviceable, particularly where the stomach is irritable. Bark is generally contra-indicated by the disposition to diarrhœa. The local means on which indeed Mr. W. places his principal reliance, both for relief and cure, consist in the application of nitric acid and other stimulating dressings.

"The method from which I have derived most benefit is as follows: if the disease be not far advanced, I at once apply the undilute acid, after cleansing the surface with tepid water, and absorbing the moisture with lint. Where, however, there is a thick and pulpy slough, it is better to remove as much as possible with forceps and scissors, before the application is made. The surrounding parts being then protected with a thick coating of lard or cerate, I proceed to press steadily and for some minutes a thick pledget of lint, previously immersed in the undilute acid, on every point."

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XIV. *An Account of a Case of Tetanus successfully treated in the York Military Hospital at Chelsea.* By M. A. Burmester, Esq.

This was a case of traumatic tetanus preceded by fever, from exposure to cold and moisture. It was treated by copious depletion, opium, mercury, and the *warm* bath; and after ptyalism had been produced, the patient was directed to take the compound powder of ipecacuanha.

Another case is mentioned in which an unexpected recovery happened apparently from the supervention of gangrene in the wound, after salivation had been established, and opium and the warm bath had been employed, without any visible advantage.

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XV. *Case of a Separation of a Portion of the Uterus during severe Labour.* By. P. N. Scott, Esq. Norwich.

During a tedious and very severe labour, Mrs. Hall felt the uterus suddenly snap. The pains instantly ceased, and uterine hæmorrhage came on attended with syncope, cold perspiration, feeble pulse, and vomiting of a brownish fluid. On introducing his hand Mr. Scott found among the coagula a portion of the uterus, containing the os uteri and an irregular part of the cervix surrounding it. The delivery was completed with the vectis. For four or five days it was necessary to evacuate the bladder with the catheter, distention of the abdomen with fever followed, and the bowels became exceed-

ingly costive; but the patient at length got well. She has a slight prolapsus uteri, and menstruates.

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XVI. *A Case of Inguinal Aneurism successfully treated by tying the external Iliac Artery.* By EDWARD SALMON, Esq. Surgeon to the First Battalion of the Third Regiment of Guards.

The aneurism had existed ten months, and extended to Poupart's ligament. An incision was made through the integuments three inches and a half in length from the spine of the ilium to the base of the tumour. The aponeurosis of the external oblique was divided to the same extent. The internal oblique and the transverse muscles were divided with a probe-pointed bistoury to the extent of one inch and a half. The peritonæum being pushed aside, an incision was made with the scalpel on each side of the iliac artery, and a ligature was carried under it and tied. The wound was brought together with a suture and adhesive plasters. No difference in the temperature of the extremities followed, and, on the third day, the wound had united. On the seventh day, the wound was disunited by a discharge of sanies and pus. Three weeks after the operation, the ligature came away, and the wound had nearly healed; and at the end of two months, the man was discharged in good health, with a free use of his limb, and scarcely any tumour.

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XVII. *On Lithotomy.* By PHILIP M. MARTINEAU, Esq. Senior Surgeon to the Norfolk and Norwich Hospital.

Mr. Martineau is an advocate for the lateral operation, and attempts to prove that Mr. Carpue's reasons for preferring the high operation are by no means conclusive.

In the first years of his practice, Mr. M. was not very successful, and, finding that his misfortunes arose from the use of the cutting gorget, he laid it aside. During the last seventeen years, he has employed the knife only, and the blunt gorget as a conductor for the forceps; and in this period, he has only lost two out of eighty-four patients. He subjoins a table, showing the age, name and event of every case. His first incision is made nearly in a line with the raphé, and the staff he uses, has a groove much wider and deeper than is commonly made. Feeling the groove of the staff, he introduces the point of the knife into it, as low down as he can, and cuts the membranous part of the urethra, continuing the knife through the prostate into the bladder. Instead of enlarging the wound downwards, he turns the edge of the blade towards the ischium, and makes a lateral enlargement of the wound in withdrawing the knife.

He takes the *staff into his left hand*, while he introduces the blunt gorget with his right; and, after the latter is within the bladder, he introduces his finger, and endeavours to feel the situation of the stone. He always uses the straight forceps, and says it will be found more easy to extract a stone whole by rather large forceps, than with flat or small ones.

After the operation a piece of lint is laid *over* the wound, and the air is excluded as much as possible, by a pledget of tow: it being

Mr. M.'s object, to heal by the first intention. Coagula are removed by the finger pushed through the opening into the bladder, or by a female catheter. Pain should be relieved by opium, and abdominal tension by fomentations, blisters, and aperients. Mr. M. *never bleeds* his patients after lithotomy, and observes that, he has witnessed such debility succeed venesection, as could not be overcome; and he considers leeches altogether useless. The diet for the first two or three days, is mild, and, if fever and inflammation are absent, it is afterwards more generous. In general, Mr. M. believes, that death is oftener produced by exhaustion and despondency, than by acute disease.

In Norfolk and Suffolk, stone in the bladder is almost exclusively confined to the poor, and it appears often in infants, before diet can have any influence. The food of the poor is neither bad nor sparing, and the people are remarkable for cleanliness. It is a curious fact, that after the operation, scarcely a case occurs, in which the stone is generated a second time; and when that does happen, it may usually be traced to the breaking of the stone, whereby a fragment is left behind as a future nucleus.

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XVIII. *Case of Cynanche Laryngea, in which Tracheotomy and Mercury were successfully employed: with Remarks.* By William Porter, Esq. A. M. Surgeon to the Meath Hospital and County of Dublin Infirmary, and to the Dublin General Dispensary.

The patient was strong and about thirty years old.

Symptoms. The face pale and swollen, and the lips livid:

"He sat with his mouth closed, but his nostrils widely extended; his eyes seemed protruded and starting from their sockets, but at the same time the conjunctiva appeared very white, and covered with a watery suffusion. There was altogether an expression of indescribable anxiety in his countenance. His pulse was hurried but not irregular; his breathing very laborious; he made two, three, or even more attempts at inspiration for one expiration, and his muscular heavings and convulsive struggles for breath were truly painful to behold. He breathed with a peculiar hissing or whistling sound, giving a distinct idea of the forcible passage of air through a contracted aperture, and he had almost lost his voice, the utmost endeavour at speech amounting only to an indistinct whisper." 416.

Treatment. Ten grains of calomel. The veins of both arms opened at once, and thirty or forty ounces of blood withdrawn, the patient being erect. Two hours after this the pulse was scarcely to be felt, the extremities were cold, and he was almost insensible. While in this state tracheotomy was thought necessary.

"An incision was made nearly three inches in length, commencing a little above the cricoid cartilage, and continued towards the sternum, dividing the skin and cellular substance down to the muscles. At this period of the operation two small lymphatic glands were exposed, which protruded forwards, and interrupting the view of the parts, were cut away. The incision was then carried deeper, still

preserving the exact central line of the neck, until a fascia covering the trachea was exposed; and here lay the greatest difficulty of the operation. The trachea was moved upwards and downwards behind this fascia, according to the patient's exertions to breathe, and it was impossible to open it satisfactorily until this membrane was completely removed, a proceeding that occupied some time: it was however effected; the trachea was laid bare, in extent about three-fourths of an inch, and a circular portion removed, the diameter of which might have been nearly one-fourth of an inch." 419.

The moment the air was admitted through the wound into the trachea, the patient felt immediate relief, and began to recover his sensibility. A silver tube was passed into the aperture and retained by means of tape. Although the central slip, connecting the thyroid lobes, was completely divided, there was scarcely any bleeding. One large thyroid vein is sometimes found running along the middle of the trachea, which should always be carefully avoided.

Two more ten-grain doses of calomel were given at intervals after the operation, and warm wine and water allowed. The second day, the canula having slipped out, the symptoms returned, but were speedily relieved. Three more ten-grain doses of calomel were taken, and on the third day two doses of the same strength, although the bowels were open. On the fourth day salivation commenced, and the man made a good attempt to speak; and on the fifth, the opening into the trachea being found too small, it was enlarged, so as to render it three-eighths of an inch long. From this time nothing particular occurred to retard his recovery; and on the 21st day after the operation the wound in the trachea had united, and the patient was soon afterwards discharged in perfect health.

When inflammation in the larynx assumes an acute form, Mr. Porter conceives that it is probable an effusion of fluid may take place in the submucous structure in such quantity, and with such rapidity, as to close up the passage and produce suffocation.

"A melancholy proof of this lately occurred in the person of a young gentleman of high attainments; he only complained during the day of sore throat, and on the morning following was found in his bed quite dead. On dissection, the rima glottidis was found completely closed by the œdematous swelling of the mucous membrane." 428.

As soon as the nature of the disease is ascertained, and it is found to be of an active nature, Mr. P. advises as early an operation as possible, with the view of preventing the formation of disease in the lungs, as well as of affording speedy relief to the sufferings of the patient.

"If, then, the disease has occurred suddenly, and its symptoms have attained an alarming height in a short space of time, if there is expressive difficulty of breathing, and laborious muscular efforts to carry it on, the practitioner has but one resource, and that one will be in an operation. And although it is very possible that even in this he may not prove successful, if diseased action has already been

formed in the lungs, yet he will be justified in the attempt, from the consideration that it is the only hope of safety he can hold out to his patient, and he will, at all events, be in some degree rewarded by the immediate alleviation it will afford to the most distressing symptoms." 437.

In the chronic as well as in the acute form of the disease there is no medicine, which has yet been found to possess such efficacy as mercury, when administered in such quantity and in such a manner as will rapidly bring the constitution under its influence; and in these cases, should any sudden or severe exacerbations threaten the lungs with disease, bronchotomy may be safely resorted to, and will probably be followed by a favourable result. It is an unfortunate circumstance, however, that the diagnosis of laryngeal inflammation is rendered difficult by the similarity of symptoms produced by different affections of the larynx.

We have thus attempted an outline of Mr. Porter's excellent paper. It is, however, so full of useful information on the subject of laryngitis, that we think our readers will be much gratified and instructed by an attentive perusal of the original publication in the Society's Transactions.

XIX. *Case of a large, adipose Tumour, successfully extirpated.* By Sir Astley Cooper, Bart. F. R. S. Surgeon to Guy's Hospital.

Nicholas Pearson, aged 57, was admitted into Guy's Hospital, with an adipose tumour on the abdomen, which had been growing about forty years, and was at first no larger than a pea. Its dimensions at the time of his admission were prodigious:

"Measuring one yard and a quarter around its greatest circumference, and eighteen inches around its neck, extending, when he was sitting down, to his knees: it had increased most rapidly during the last three years, but up to the time of his admission, he expressed no other inconvenience than that of the weight he had to support, which of itself rendered him so perfectly incapable of obtaining his bread, that he was driven to the necessity of its removal." P. 443.

Operation.—"The first step of the operation was to draw the tumour to the patient's right side, and then to make an incision through the integuments and cellular membrane at its base; separating the swelling so far from its connexions as to be enabled to ascertain that it was not connected with hernia, or in any way with the abdomen; but in this investigation it was found, that a considerable portion, much more sensitive than the rest of the tumour, did project from the swelling into the umbilicus, but that it was not a hernia. Having ascertained this important point, the remaining part of the operation consisted in a simple dissection, with the application of ligatures to the veins, which were of considerable size, and bled freely, and to the arteries, which, considering the bulk of the tumour, were not so much enlarged as might have been reasonably expected. The patient lost but an inconsiderable quantity of blood during the operation." 443.

The weight of the tumour, independently of the blood it had contained, was 37 lb. 10 oz.

No bad symptoms followed, and the wound healed principally by granulations. In eight days the man was able to walk in his ward.

Appendix I. *Abstract of the Account of a Case of Adhesion of the Labia Pudendi in a Negro, obstructing Delivery, drawn up by* Dr. William Russel, of Jamaica; *presented to the Society by* William Roots, Esq. Surgeon of Kingston on Thames; *dated Cascade, St. Mary, Jamaica, June* 12, 1819.

Appendix II. *Account of a Child of three Years of Age, in whom there appeared Signs of Puberty. Abstracted from a Paper communicated to the Society by* Gilbert Breschet, M. D. Superintendent of the Anatomical Department of the Faculty of Medicine in Paris; *dated December*, 1820.

A boy, between three and four years old, with the same signs of premature puberty, is now exhibiting in London.

Medical and Philosophical Intelligence.

Anatomie de l'Homme, &c. Par Jules Cloquet.

This work has already been alluded to in our Journal; but the arrival of some additional Numbers induces us to call the attention of our brethren more particularly to it.

Livraison I. contains general considerations on the Structure of the Human Body; and then proceeds to the Bones in particular, treating of the skeleton, the joints, the trunk, the articulations of the vertebral column, and the vertebral column in general. The 1st Plate contains various figures illustrative of these subjects; consisting of portions of bone, muscle, nerve, blood-vessel, &c. &c. &c. The 2d, 3d, 4th, and 5th, different views of the spinal column. The 6th is a view of the ribs and sternum.

Livraison II.—Plate 7th, back view of the chest; 8th, the sternum, and ribs separately; 9th and 10th, the ribs in their natural situation, externally; ditto, internally; 11th, a variety of figures, showing the ligaments about the sternum, and between the vertebræ and ribs; 12th, the frontal bones of various ages, and exhibited in different positions.

Livraison III.—Plate 13th, the parietal and occipital bones in different positions; 14th, the temporal and ethmoid bones in a great variety of views; 15th, sphenoid of an adult, natural size, in different views; ditto of fœtus at the full period; 16th, the occipital bone of a fœtus at the full period; the ethmoid ditto; the parietal ditto; ossa wormiana, and cranium of a woman thirty-six years of age, seen from above, natural size; 17th, profile of the cranium without the bones of

the face; view of the base of the skull, natural size; 18th, vault of the cranium, and inside view of the base of ditto.

Livraison IV.—Plate 19th, various views of the upper jaw-bone, os malæ, and os unguis; 20th, the palate bone, vomer and ossa turbinata; 21st, various views of the lower jaw-bone; 22d, both jaws, with the teeth *in situ*, and separately; 23d, shows the formation of the teeth in the jaw; 24th, articulation of the jaw, entrance of the submaxillary nerve, &c.

Livraison V.—Plate 25th, a front and back view of the skull and lower jaw, of natural size; 26th, view of different sections of the skull in profile; 27th, ditto of the upper jaw, showing the antrum, &c. crania of fœtuses; 28th, the cranium of a woman aged ninety years, illustrating the changes produced by time; various illustrations of the facial angle, taken from the heads of Bichat, the Hottentot Venus, an orang-outang, and a wolf; 29th, heads illustrating the peculiarities of different races; 30th, ditto, ditto.

Livraison VI.—Plate 31st, various articulations of the vertebræ of the neck; 32d, os sacrum, os cocygis, and ossa innominata; 33d, back and front view of the pelvis; 34th, various views of ditto; 35th, ditto with ligaments; 36th, pelvis of fœtus, adult scapulæ, clavicles, and patella.

Livraison VII.—Plate 37th, views of the os humeri and radius of adults, ditto of fœtus, ditto of articulating extremities; 38th, the ulna and bones of the carpus; 39th, the bones of the metacarpus and fingers; 40th, articulations of the clavicles and first ribs with the sternum, of the clavicle with the scapula, of the humerus with ditto, showing the connecting ligaments; the glenoid cavity and ligaments; 41st, the anatomy of the elbow joint, the inter-osseous membrane, the joint of the wrist; 42d, ligaments connected with the wrist, carpus, and fingers; section of the bones of the finger; the articulation of the radius, with the upper extremity of the ulna.

Livraison VIII.—Plate 43d, thigh bone of adult and fœtus, articulating extremities of ditto, patella; 44th, tibia and fibula of ditto, with ditto; 45th, bones of the tarsus separately; 46th, ditto of metatarsus and toes separately; 47th, various views of the foot; 48th, ligaments, hip and knee joints.

We have been thus particular in our enumeration of the contents of the different parts of M. Cloquet's work, because, each livraison being sold separately, our readers will thus be enabled to procure any plates they may want. The manner in which these are executed, and the copious text by which they are accompanied, render the work an important addition to our anatomical books; while the price is comparatively so moderate as to put it in the power of many to procure them, who would not think of purchasing plates of the same kind executed in this country.

The utility of this work is greatly enhanced by the difficulties attending a course of dissections any where except in great towns; and, although we should be the last to recommend that the study of plates should be substituted for that minute and practical acquaintance with structure and the relative situation of parts which can only be acquired in the dissecting room, yet, on the other hand, we know

that many practitioners in the country, who have acquired their knowledge in this legitimate way, would find great satisfaction in being able to recall those impressions which, unavoidably, become less vivid and distinct when they have been long removed from the practical means of refreshing them. Nay, even in London, we are convinced that many surgeons, in the prospect of performing an operation for strangulated hernia, or tying a great artery, would find it no way unpleasant to have looked over the delineations of the parts in such a work as Cloquet's. A great drawback to such plates in general (besides their expense,) is, that they are executed either by anatomists who are not draughtsmen, or by draughtsmen who are not anatomists. Many artists, it is true, talk of having studied anatomy; but then it is only what may justly be called superficial, being literally confined to the surface, the angles of bones, and prominence of muscles, by which the contour of the figure, or expression of the countenance, may be accurately delineated. In making these remarks, it is but justice to Mr. Charles Bell to point him out as an exception; but, on the other hand, he is a solitary instance, in this country, of an able draughtsman and practical anatomist united in one person. Cloquet, we are assured, is himself expert at designing, and M. Haincelin and M. Feillette, his assistants, have bestowed particular attention to anatomy; circumstances which account for the neatness, precision, and accuracy, which distinguish these plates.

[*Lond. Med. and Phys. Journ.*

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Instances of Children born without the Œsophagus.—A male child was born in August, 1820, at the full period of utero-gestation. It was of the full size, and took the breast with avidity; but each time the milk was immediately returned by the nose and mouth, with rattling in the throat, and symptoms of impending suffocation. It, however, lived in this state for eight days. During this time, the alvine and urinary secretions were regularly voided, although in smaller quantities. Derangement about the œsophagus was suspected, and in order to ascertain its nature, an inspection was instituted after death. *Dissection.* The liver was very large, and reached rather below the umbilicus, but its form and colour were natural. The stomach was without a cardiac orifice, and at this part was united to the diaphragm by means of cellular tissue. The lung on the right side was distended, and presented a reddish colour; that on the left was compact, and dark in its appearance, evincing that the child had only breathed with the right lung. The heart possessed its usual characters at that age. The œsophagus was entirely wanting, and the pharynx formed a cul-de-sac at its inferior part.—*Hufeland's Journal*, 1821.

An instance entirely similar to the one just related occurred some time since to Mr. Hallam, of Walworth. This child lived six or seven days. During that time, whatever was attempted to be given was returned in the manner already described. The alvine and urinary secretion were regularly voided, but in smaller quantity. On inspection, after the child's death, the œsophagus was found wanting, as in the case recorded by Hufeland. The pharynx and stomach,

with the intervening parts, were preserved by Mr. Hallam, and are in the possession of Sir Astley Cooper.

These cases are interesting, chiefly on account of the regular appearance of alvine evacuations which occurred in them both. This circumstance furnishes a very conclusive proof, that at least the chief part of the intestinal excretions consists of secretions from the mucous surface of the digestive tube, especially from the follicular apparatus, and of the excrementitious parts of the hepatic and pancreatic secretions. [*Lond. Med. Repository.*

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Dr. Richardson's Recommendation of the Climate of Egypt and Nubia in Pulmonic Diseases.—Nothing can exceed the beauty of the mornings and evenings in Nubia. The air is light and clear, and cool, and all the senses, as if bathed in the breath of heaven, cling with rapture to every blade of grass, or every opening plant. During the whole of yesterday the sky was without a cloud, and in the evening the constellations were particularly bright. All of us had seen the sky of Italy and Greece, but for brightness, the nocturnal sky of Egypt and Nubia surpasses them all, as much as they do that of England. Many a pulmonic patient, who feels his sickly fabric chilled and pierced by the snow-winds of Vesuvius, would be soothed and healed by the unirritating and balmy air of Egypt and Nubia. Nor is the distance so appalling; it only seems far to those who have not tried it. The traveller will go in a shorter time, and with less fatigue, from Marseilles to Alexandria in Egypt, than, at an average rate of travelling, he can go by land from Geneva to Naples. The accommodation is always good, and there is no chance of incurring fresh exacerbations of disease; all the way up the Nile he carries his house along with him, leaves it, and returns to it when he pleases. His mind is constantly engaged with the unremitting succession of new and interesting objects that occur in every step of his journey, and that without one single circumstance to discompose or annoy him; every where, he can purchase, at a moderate rate, such articles of provisions as are necessary for his comfort, excepting wine, and that he can easily carry with him from Alexandria and Cairo. His medicines he ought to take from London.—*Travels in Egypt and Palestine, by Dr. Richardson, vol.* i. *p.* 392.

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The Epidemic Fever of Barcelona.—The medical commission sent from Paris to Barcelona, by the French minister, in order to inquire into the nature, causes, and phenomena of the fever which ravaged that city, has arrived in Paris, and made their report. This commission was composed of the following physicians,—MM. Bally, François, Mazet, Pariset, and Rochoux. They had all seen the fevers usually called the yellow fever, and had long since made up their minds as to the contagious or non-contagious nature of that disease. M. Rochoux asserted the latter character, and the other physicians were convinced of the former before they even saw the fever they were sent to examine into and report upon. Soon after their arrival at Barcelona, they were joined by other physicians,—they quarrelled,

—one died,—another fell ill of the disease,—and, finally, they are now at variance respecting its nature. [*Lond. Med. Repos.*

History of a Singular Disease of the Nervous System. By F. Magendie, Member of the Institute, &c.—M. ——, aged thirty-six years, of an agreeable *physique*, cultivated mind, and a pleasant companion, but of great nervous susceptibility, led a gay life prior to his marriage, which took place about six years ago. At that time he experienced some crosses in business, and was afterwards severely afflicted, in consequence of a mental disease which attacked his wife, at the time of her first accouchement. He never left her during the whole of the disease, but accompanied her in a journey, and was thus witness, for nearly a year, of the incoherencies and convulsive affections of a being for whom he had the most tender attachment. The complete cure of Madame —— put an end to the moral torture which her husband experienced; but, instead of giving way to joy, which such a fortunate event might naturally occasion, he remained dull and silent, and gradually showed every symptom of real melancholy—believing himself inevitably ruined, and feeling persuaded that he was the object of animadversion by the laws, of the searches of the police, and of public raillery. His mind was perfectly correct upon every other subject. He was recommended to travel, to take the waters, and to undergo different modes of treatment, but without success.

Things were in this condition, when, in the month of September last, he was seized with a degree of stiffness in the right leg and thigh, to such an extent as to cause him to limp. A few days afterwards, a similar stiffness attacked the opposite thigh and leg; and he subsequently lost all power of volition over his movements. The limbs were, however, far from being paralyzed, but they were, in some measure, isolated for whole hours: he was then obliged to execute the most irregular movements, to assume the most whimsical attitudes, and to make the most extraordinary contortions. It is impossible for language to paint the multiplicity, the strangeness of his movements and positions. If he had lived in times of ignorance, he would, doubtless, have passed for one possessed of a devil; for his contortions were so far removed from the movements proper to man, that they might easily have been regarded as diabolic. It was worthy of remark, that, in the midst of these contortions into which his thin, supple body was thrown, sometimes forwards, sometimes behind, or to one side, like certain vaulters, he never lost his equilibrium, and that, in the great number of attitudes and singular movements which he executed during several months, he never happened to fall. In certain cases, his movements re-entered into the class of ordinary movements; thus, without his will participating in the least in the world, he would get up and walk rapidly, until he met some solid body which obstructed his passage; sometimes he started backwards with the same promptitude, and was only stopped by a similar cause. He was often observed to resume the use of certain movements, without being able in any manner to direct the others: thus, his arms and hands frequently obeyed his will; and, more frequently still, the

muscles of the face and of speech. It was sometimes possible for him to recoil, when his progress in advance was interdicted, and he then made use of this retrograde movement, for the purpose of directing himself towards the objects which he was anxious to reach.

Finally: these movements, which might be called *automatical*, never continued a whole day: he had tolerably long, quiet intervals between the paroxysms, and his nights were always tranquil.

Although the contractions were very violent, so as to produce copious perspiration, when they had ceased, he experienced no feeling of fatigue, proportionate to the intenseness of the efforts which he had made—as if the intellectual exertion which we make use of, in order to excite our movements, is that which becomes the most fatigued in us.

Reckoning from the day on which the movements showed themselves, there was a slight amelioration in his moral condition.

The physicians of the province in which he dwelt made use of several means against this singular disease. Amongst others, baths, leeches, antispasmodics, &c., were useless. They then decided upon sending him to Paris, where he arrived in the month of December last, and put himself under my care.

I employed the first days in studying his condition, which I could not class under any known disease. It was not a catalepsy, for the movements were frequently rapid and multiplied; there were no convulsions, for the contractions had a certain *ensemble*, and a sort of regularity in the disorder of the movements; and it was not the dance of St. Guy, for in that there is an agitation, a friskiness, and a versatility in the contractions, which were not perceptible in this patient.

What was to be done in such a case? and how much the emptiness of medical theories is felt upon such occasions!

Many remedies had already been employed, and it was necessary to try others.

Having no particular motive, and seeing, moreover, no inconvenience from it, I decided upon administering the sulphate of quinine, which was given in the dose of two grains a day, in a small potion.

From the second day an appearance of amendment was perceptible; on the third it was evident, and, on the sixth, all the *automatical* phenomena had disappeared; and M. ——, to his great satisfaction, regained the supreme direction of his locomotive system.

From this moment, (about four months from the present time) he has had several slight relapses, always produced by strong moral commotions, such as the death of his sister and father-in-law. At the first time, I considered it proper to have recourse to the curative means which I had employed with so much success, and I obtained from it a speedy cessation of the symptoms.

In the last month, there have been some involuntary movements, which continued for some hours and disappeared of themselves.

A final remark, which I should not forget, is, that the influence of volition over the movements was gradually restored: for example, during several weeks he was unable to run, and, consequently, felt obliged to be contented with walking, and even with this to a certain limit, both as regarded the extent of his steps and their speed.

[*Journal de Physiologie.*

Case of an Extraordinary number of Calculi in the Bladder.*—A man, sixty years of age, who had long suffered from dyspepsia, had, in 1804, the first attack of gout, and soon after, conjoined with it, some symptoms of gravel. These last he at first disregarded, but they gradually increased, until at length violent inflammation of the bladder supervened. He now applied for medical advice, and various remedies of a palliative and antiphlogistic kind were employed; and the return of the gout was solicited. At length alleviation of the symptoms was produced, and several calculi were passed by urine. The circumference of the swelling of the bladder was also diminished, and the progress of the inflammation checked; nevertheless, this severe malady did not cease. It assumed every day more and more the symptoms of chronic inflammation of the bladder, which, after thirty days of intolerable torment, ended in death.

On dissection, the coats of the bladder were found unusually thick, and there were discovered within it 398 calculi, of different forms, and from the size of a pea to that of a Spanish olive. This number of stones exceeds any that has yet been remarked. Three hundred have, however, been passed by urine by a female, as recorded by Tulpius in the Observ. Med. l. ii. c. 47.

By a chemical analysis of the stones, instituted by Professor Moyon, they were found to consist of phosphate of lime, phosphate of magnesia, and uric acid.—*Quarterly Journal of Foreign Medicine and Surgery.*

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Black Urine.—It appears from Dr. Marcet's paper in the Medico-Chirurgical Transactions, that he has met with some cases in which black urine had been voided. At the request of Dr. Marcet, some was examined by Dr. Prout, who gives the following account of its chemical properties:

The residuum obtained from this urine by evaporation, not only does not contain any lithic acid, as was observed by Dr. Marcet, but no urea can be detected in it by the tests which indicates its presence.

Although the addition of dilute acids produced no immediate change of colour in the urine, yet, on standing for some time, a black precipitate slowly subsided, leaving the supernatant fluid transparent, and but slightly coloured.

The black precipitate thus obtained was found to be nearly insoluble either in water or alcohol, whether hot or cold. It readily dissolved in cold concentrated sulphuric and nitric acid, forming a deep brownish black solution; but, on diluting the acids with water, the black substance appeared to be again precipitated unaltered. These acids, however, by the assistance of heat, apparently decomposed it. The black substance readily dissolved in the fixed alkalies and in the alkaline subcarbonates, forming very dark solutions. The addition of water did not affect these solutions; but acids reprecipitated the substance apparently unchanged. When ammonia was employed as the solvent, and the excess expelled by evaporation to dryness, a black or deep-

* Magazin der Auslaendischen Literatur. Hamburg. Jan. Feb. 1822.

brown residuum was obtained, which appeared to be a compound of the black substance with ammonia, and possessed the following properties:

It was very soluble in water; and, on being heated with caustic potash, it gave off the smell of ammonia. The black compound, however, did not appear to have any tendency to assume the crystalline form.

In evaporating to dryness, on a piece of glass, the ammoniacal solution in which the black substance had been dissolved, the residuum split into most minute fragments, having a regular and very peculiar appearance, especially when examined with a magnifier.

From the solutions of this compound in water, muriate of barytes and nitrate of silver produced copious brown precipitates, as did also proto-nitrate of mercury and nitrate of lead; but oxymuriate of mercury produced no immediate precipitate, and that obtained from acetate of zinc was of a paler brown colour.

From these experiments, Dr. Prout concludes that the remarkable specimen of urine in question owes its black colour to a compound of a peculiar principle with ammonia, as Dr. Marcet had inferred from his own trials; but he is, moreover, inclined to think that the black principle itself, such as is obtained from the urine by the action of dilute acids, may be considered as a new body possessed of acid properties. From the small quantity of the specimen, however, which could be spared for Dr. Prout's experiments, it was impossible to obtain complete and decisive evidence on the nature of this substance; but it appears to be sufficiently characterized as a peculiar acid, and to bear a closer analogy to the lithic acid, or rather to some of the compounds which it forms when acted upon by the nitric acid, than to any other principle usually found in the urine.

Should this view of the subject be confirmed by further observations, Dr. Prout would propose to distinguish this new substance on account of its black colour, by the name of *Melanic acid.* [*Annals of Phil.*

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Croup.—Dr. Reddelin, of Wismar, has communicated to the Royal Society of Gottingen, through Professor Blumenbach, the following successful treatment of croup, after the usual remedies had been tried without effect. The patient was a female, aged nineteen, who, on the third day after being seized with the croup, was unable to swallow, had begun to rattle in the throat, and seemed approaching rapidly her dissolution. Dr. Reddelin insinuated, by means of a quill, a mixture of Spanish snuff and marocco into her nostrils, and, after repeating this mixture a second time, it excited sneezing and vomiting: this occasioned the discharge of two long membranous cylinders from the trachea, upon which the rattling immediately ceased, and the patient was rescued from instantaneous suffocation. One of the tubes, when slit open, measured nine French lines in breadth; they were quite elastic, and bore a strong extension without injury to their fibrous texture.

[*New Mon. Mag.*

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Bronchocele.—We have been informed, by a correspondent from Horsham, Sussex, that the iodine has been found very successful in

the cure of bronchocele in that town and its vicinity. Ten drops of the tincture of iodine taken three times a-day, has generally been found to remove the complaint in the course of five or six weeks. The subjects are almost all females, about the age of puberty. In our next we hope to be able to give a more detailed account of some of these cases. It must be remarked, that bronchocele is a disease of very frequent occurrence in that part of the country, and that it scarcely ever is met with in the male sex.

[*Lond. Med. and Phys. Journ.*

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M. J. A. Lejumeau de Kergaradec has lately published a small memoir upon the Application of Auscultation to the Study of Pregnancy. By means of the *stethoscope* or *pectoriloque* of Laennec, he is of opinion, that the pulsation of the heart of the fœtus may be distinguished from those of the arteries of the mother; and that, by an attention to the different sounds communicated to the ear, we may determine, in doubtful cases, whether the fœtus in utero is alive or dead. MM. Kergaradec and Laennec are both of opinion, that the *stethoscope* and the immediate application of the ear, are attended with the same advantages; but M. Fodera considers, that although, for the purposes of delicacy, the *stethoscope* may be sometimes preferred, yet that we may frequently be able to detect diseases by the immediate application of the ear, which we are not able to do with the *stethoscope;* and he consequently gives the preference to auscultation performed in that manner, in all cases where the *stethoscope* may be considered necessary. [*Lond. Med. Repository.*

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M. Piédagnel has detailed the history of a case of neuralgia of the right infra-orbitar nerve, which was cured by the sulphate of quinine. The subject of this case was a lady, aged twenty-nine years, of a lymphatic temperament. The paroxysms came on, daily, about nine o'clock in the morning, and continued for two or three hours. M. Piédagnel did not see her until the ninth paroxysm. Compresses, dipped in sulphuric ether, sinapisms to the feet, and stimulating pediluvia, were made use of; and at the end of about two hours' perseverance in these means, or nearly three from the commencement of the paroxysm, she obtained relief. On the following day it did not return until half-past eleven, but was more severe than ever. The same means were continued, with the addition of an antispasmodic potion. At two, no relief had been obtained, when a grain of extract of gum opium was given, but without effect: this was repeated at three, in a double dose, and six leeches were applied upon the pained part, and the like number behind the ear of the same side. About four, the pain was considerably augmented, and was accompanied with delirium and slight convulsions. At five, she experienced a trifling amendment; and, at half-past six, the paroxysm ceased. Finding that the disease continued to make progress, and recollecting that he had seen cases of neuralgia yield to the cinchona, M. Piédagnel determined, as this case was of an intermittent kind, to administer that medicine in a large dose. Ten grains of the sulphate of quinine were dissolved in equal portions of orange flower water and simple syrup; and a

fourth part was directed to be taken at eleven, and repeated at midnight, and the remainder to be taken in two doses, at eight and nine in the morning: the result was, that she had no fresh accession. In the evening and next day a similar potion was repeated, but containing only four grains of the sulphate of quinine. The patient was completely cured. [*Ibid.*

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At a General Court of the Governors of the Small-pox Hospital, held June 6, 1822, it was resolved and ordered, that, from and after the 1st of July, 1822, the Practice of Variolous Inoculation be wholly discontinued at this Hospital, and that the future title of it be, "*Hospital for the Casual Small-pox and for Vaccination.*"

On that occasion the following Report was laid before the Governors, and ordered to be printed and circulated:—

To his Royal Highness the Duke of York, President; to the Vice-Presidents, Treasurer, and Governors, of the Hospital for Small-pox and Vaccination, at St. Pancras:

Your Physician desires to call your attention to the proceedings which have taken place within the walls of your Hospital during the present year, in so far as they have fallen under his cognizance, as Medical Attendant of the Institution; and to report upon the degree of benefit to the community at large, which your establishment during that period may claim to have effected.

Sixty-nine patients, labouring under the casual small-pox have been admitted, between the 1st of January and 5th of June, 1822. Of these thirty-five have had the disease in a severe, and thirty-four in a mild form. Forty-four have been discharged cured, eighteen have died, and seven remain under treatment. The proportion of admissions, of severe cases, and deaths, is nearly the same with that of the two preceding years; and it shows, that although small-pox has not been particularly prevalent in the metropolis, it has lost nothing of its malignity, and the same necessity exists now, as formerly, for those measures of prevention and relief, which it is the humane design of your Institution to provide.

It is peculiarly gratifying to your Physician to report, that the department of your Establishment appropriated to Vaccination, has prospered during the last five months in an unexampled manner. 1524 persons have been vaccinated at the Hospital in that period, being an increase of one-fourth above the numbers of the former year. It must afford great satisfaction to the Governors to observe, that the confidence of the public in the efficacy of vaccination would thus appear from their books to be on the increase; and it may be presumed, that such is the general feeling in London, when it is considered, that the applicants for vaccination at this Hospital are not confined to its own immediate neighbourhood, but are spread over the most distant parts of the metropolis.

The regularity with which mothers attend with their children, at the stated periods, during the progress of vaccination, is highly exemplary, and it has the double advantage of enabling your Physician to certify the correctness with which the process has been gone through,

and to ensure to the public, at all times, an ample supply of vaccine lymph, in its most perfect state.

The nature of your Institution has afforded to your Physician opportunities of forming a judgment on several points connected with vaccination, which attract a great share of public attention; and he is desirous to report to the Governors, to what extent he has observed small-pox to prevail after vaccination, and how far the occurrence of such cases has already influenced, or appears likely in future to influence, the practice of cow-pock inoculation.

In the present year, twenty-two out of the sixty-nine who have been admitted, state themselves to have undergone vaccination at some former period. Seven of them had the disease in a severe and unmitigated form, and fifteen in that mild and modified way, to which the term "Varioloid" is usually applied. In the larger proportion of instances, the mildness of the secondary disorder was strikingly displayed; and within the wards of your Hospital it afforded an instructive contrast to the malignant character which the disease too frequently assumed in those who did not enjoy the protecting influence of vaccination.

In the severer cases, as no scars were apparent on the arms, it is highly probable that vaccination had totally failed, and that the patient, or his parents, had considered the puncture of the arm as equivalent to perfect vaccination. The most experienced practitioners, however, have frequent occasion to observe, that the first insertion of the virus is ineffectual, and that the success of the process can be ensured only by unremitting attention. That this may have been the source of fallacy in several of these cases, is rendered the more probable, by the fact, that in every instance of small-pox, subsequent to vaccination, which has occurred during the present year, the patient had been vaccinated in the country; and it is obvious, how much greater is the chance, that, under such circumstances, the indispensable inspection of the progress of the vesicle may have been neglected.

Your Physician has had occasion to notice, that the proportion of persons vaccinated at your Institution, who are known to have taken small-pox in after life, is very small. A few cases of the kind have indeed fallen under his observation, but they were all of the mildest kind, and it was gratifying to him to perceive, that these, so far from deterring from the practice of vaccination, impressed upon the parents its value, and strengthened their faith in its efficacy. Upon the whole, your Physician is inclined to believe, that the cases in which regular vaccination fails in imparting either a protecting, or a highly important modifying power, are so few as hardly to merit notice, and infinitely too rare to affect, in any sensible degree, the beneficial practice of vaccination. GEORGE GREGORY, M. D.

London, 6th June, 1822.

[*Lond. Med. Rep.*

Acetate of Morphine.—M. Alloneau, M. D. of Thouars, has detailed eight cases in which he has given this remedy to adults: it was given in doses of a quarter of a grain to one grain per diem, begin-

ning sometimes with a quarter, sometimes with half a grain. Of these eight patients, five were consumptive: the remedy was given to allay the cough and to procure sleep. In two of these cases it succeeded, in the three others it failed. The other three patients had chronic diseases of the ovary, the heart, and the stomach. This last patient was entirely cured. The affection of the heart was relieved by it; but the effect was only temporary. In the case of diseased ovary, it cured all the numerous sympathetic irritations that existed: but the complaint remained unchanged. It must be remarked, that Dr. Magendie had before employed this medicine to relieve the pain of a schirrous breast. The author confirms the observation of Mr. Lens, that morphine in these doses does not cause excitement, headach, constipation, or stupor, as the other preparations of opium do. [*Bibl. Med.*

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Corrosive Sublimate.—Dr. Davy has made some interesting observations on corrosive sublimate. It is known that the liquor hydrargyri oxymuriatis of the London Pharmacopœia, on exposure to light, slowly undergoes decomposition; and it has been asserted that light has a similar effect on corrosive sublimate itself. Dr. Davy relates a number of experiments made to investigate these points. He finds that corrosive sublimate remains unaltered on exposure to light; that it remains unaltered when exposed in solution in media having a strong affinity for it, as alcohol, ether, muriatic acid, &c.; and that decomposition takes place only under circumstances of complicated affinities, as in the instance of the liquor hydrargyri oxymuriatis, and in the aqueous solution, when calomel and muriatic acid appear to be formed, and oxygen evolved.

For the purpose of further illustration of the subject, Dr. Davy describes a series of experiments on corrosive sublimate with alcohol, ether, several oils, muriatic and the mineral acids, many of the muriates, &c.; the results of which hardly admit of being given in the form of abstract. In every instance that an oil, whether volatile or fixed, was heated with corrosive sublimate, mutual decomposition took place, charcoal was evolved, and muriatic acid and calomel formed. Besides, when oil of turpentine was used, some traces of artificial camphor appeared; and, when the oils of cloves and peppermint, a purple compound distilled over, consisting of the oil employed and muriatic acid. With muriatic acid, common salt, and some other muriates, corrosive sublimate formed definite compounds remarkable for their solubility. [*Annals of Philosophy.*

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Pure Magnesia in Diabetes.—Dr. Trotter cures diabetes mellitus by pure magnesia, given in about the aggregate dose of ʒij. every day. Two cases are related, in which, on the third day, the thirst declined, the appetite became less voracious, the urine lessened in quantity, and became altered in quality, the bowels were profusely purged, and, what is more satisfactory, the patients recovered in a week or two. The diet was what is commonly used by the labouring classes. It seems that Dr. T. places much dependance on pure magnesia, as a remedy for diseases of the nervous temperament [*Med. Intelligencer.*

Mr. Lizars on the Decoction of Oak Bark in Hernia.—For these many years past, I have used for reducible hernia, either in the adult male, female, or in children, a strong decoction of oak bark, with wonderful success. In men I have succeeded in curing them from birth to 75 years of age, and in women to 50 years of age. Children are very easily cured by this means, particularly of the umbilical hernia.

The manner of preparing the decoction is, to macerate a few pounds of oak bark, in a sufficient quantity of cold water, for twelve or twenty-four hours, then to put both bark and solution into a large boiler, and to keep the fluid at the boiling temperature, over a gentle fire, for two or three days, adding, when required, boiling water from time to time, so that the bark may be always covered. The intention is to extract all the virtues of the bark. The bark, after this slow decoction, should be removed, washed with more boiling water, which is to be added to the strong decoction, and reduced to the consistence of nearly an inspissitated juice. When used, it should be warmed, to suspend the astringent matter; the hernia must be previously reduced; then the groin bathed or splashed, and the truss applied immediately after. The application should be repeated three or four times a-day. In this way I have succeeded in curing herniæ of many years standing, in the course of a few weeks. In general, it requires a perseverance of three months. A case of double rupture, one of which the patient had laboured under for twelve years, was cured in nine days. He was 36 years of age, and had been invalided out of the public service for the complaint. In umbilical hernia, so common to children, it succeeds very soon.

The modus operandi appears to be, *first*, the corrugation of the skin and contraction of the muscles; *secondly*, increased determination to the part; *thirdly*, a deposition of substance, most probably cellular substance, which effectually shuts up the aperture. That there is a contraction of the muscles, we are entitled to conclude, from the tumour not so readily protruding after each application of the decoction. That there is a local determination, is evident from the stimulus applied, and the heat produced. *Lastly*, that a deposition of substance takes place, we are entitled to infer, by the treatment proving effectual in the cure of crural hernia, where no muscular contraction can take place to any extent.

This invaluable remedy was mentioned to me by a merchant in this neighbourhood, who cured himself after having laboured under the disease for many years. In 1757, an hospital was constituted, near Westminster Bridge, for ruptured people, and a Mr. Lee of Arundel Street was appointed surgeon. This gentleman is said to have been successful in curing men belonging to the army and navy, after they had been invalided and sent to Chelsea and Greenwich Hospitals. These men were returned fit for the service. One was 74 years old, and had been ruptured for ten years. I can find no trace of the treatment adopted by this gentleman; but it is possible that it may have proceeded on the same principles.

[*Edin. Med. and Surg. Journ.*

Analysis of an Aerolite.—M. Laugier states that he has performed four analyses of the aerolite which fell at Juvenas: the first by means of acid; the second by potash; the third by nitric acid, with the intention of determining the quantity of sulphur; the fourth by means of nitrate of barytes, for the purpose of determining the quantity of the potash which M. Vauquelin had found in this stone, although he did not employ this method, the only one which can be relied on. These several analyses, all agreeing as to the nature of the elements of stone, varied slightly with respect to their proportions; a variation which must be attributed to its being deficient in homogeneity in all its parts.

The second analysis, that by potash, which appeared to M. Laugier to be the most correct, gave the following results:

Silica	40
Oxide of iron	23.5
Oxide of manganese	6.5
Alumina	10.4
Lime	9.2
Chrome	1
Magnesia	0.8
Sulphur	0.5
Potash	0.2
Copper	0.1
Indispensable loss	3.0
Loss from unknown causes	4.8
	100.0

M. Laugier observes, that the loss of four or five per cent. which always occurred in his analyses, instead of the increase which, in these kinds of analyses, usually results from metals which the aerolites contain, renders it probable that, in the aerolite of Juvinas, the iron and manganese exist in the state of oxides. No portion of this aerolite reduced to powder was attracted by the magnet, which renders this conjecture more probable.

M. Laugier endeavoured to discover whether this loss was owing to carbonic acid, but the stone did not appear to contain any; in a subsequent analysis he found, however, that it yielded rather more sulphur than stated in the analysis. He afterwards observes, that this aerolite resembles one which fell at Ionzac in its analysis, and especially in the absence of nickel; and also with an aerolite which fell, in 1813, in the environs of Lantola, a village in the government of Wibourg, in Finland. These are the only aerolites which have been hitherto found destitute of nickel. [*Annals of Philosophy.*

—

Meteoric Iron.—Dr. William Zimmerman, professor of chemistry in the university of Giessen, has discovered that all the aqueous atmospherical precipitates or deposits, (dew, snow, rain, and hail,) during that period, contained meteoric iron, which was usually combined, in the same manner as in meteoric stones, with nickel. Almost all the rains

contained common salt, and a new organic substance composed of hydrogen, oxygen, and carbon, which the discoverer has called *pyrine*. In the same manner the rain water was found, on several occasions, indubitably to contain several kinds of earths. The rains in February and March particularly abounded in these ingredients, which are found also in the meteoric stones. From contemporary observations made on various eminences, Diensberg, the Castle of Gleiberg, a tower of the barracks at Giessen, &c. various other results were obtained, several of which are in favour of the opinion that the stony meteoric masses are of telluric, and not of cosmic, origin.

[*New Monthly Magazine.*

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Effects of an over-dose of Digitalis.—A man had a severe attack of asthma, which had withstood bleeding, digitalis in smaller doses, and all the common remedies, sleep being only occasionally procured by giving an emetic at night, that is probably by relieving an overloaded stomach. He imprudently took an ounce of good tincture of digitalis. He immediately fell asleep, and slept for three hours and a half, when he was sick and had a motion: he then again slept quietly. A strong emetic was given some time afterwards; but he continued well till the eighth hour, when the pulse began slightly to intermit. Strong punch was given. 13th hour, the intermissions were rather more frequent; and liquor ammoniæ gtt. xx. were given every hour. An account is given of the variation of the pulse, as it was noted every half hour; but though it was once, about the 22d hour, as low as 36, yet the patient's asthma was cured, and he complained of no pain or uneasiness. He continued perfectly free from asthma. The intermission did not remain 24 hours. The medicine appeared to act immediately as a sedative. [*Medical Intel.*

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Utility of the Nicotiana Tabacum, in some cases of Phlegmasiæ, &c.—A strong woman had violent pneumonia; so that, after 96 ounces of blood had been abstracted at five bleedings, the breathing continued difficult to the greatest degree. A glyster of 35 grains of tobacco, infused for half an hour in ℥xij. of boiling water, produced immediate relief. She was sick after it; but in a few days she was well without further treatment.

In a case of cynanche tonsillaris, the patient, five years of age, and the bowels obstinately costive for three days, in spite of medicine, a "very weak" tobacco glyster was given. Sickness and four large fœtid stools followed, and the boy was soon in health again.

A similar case follows, which was treated with similar success; the disease being pneumonia, with obstinate constipation. Patient three years of age. [*Ibid.*

—

Use of Oil of Turpentine in Worms.—Dr. Gibney says that turpentine is very useful in "some stages" of puerperal fever, but that it is *almost* a specific in worms of all kinds. The dose, however, is important. If the quantity be too small, it will affect the kidneys and

skin: therefore Dr. G. gives from ʒi. to ʒij. at intervals, to children of three years old; ʒvi. to older children, and more to adults. He gives it uncombined with other medicines, and on an empty stomach; and he enjoins strict abstinence during its use. He gives "a good dose" early in the morning, and repeats it every hour for three or four hours, as circumstances point out. He mixes it with mucilage, cinnamon water, and syrup, and sometimes with aromatics, and gives castor oil afterwards, if necessary. He repeats the medicine at intervals of four or five days, for some time after the worms have been evacuated; "the permanent healthy appearance of the stools" being the sign for leaving it off.

Seven illustrative cases are given. The symptoms were generally those of infantile fever, and all the patients had "dark, slimy, and fœtid stools." Sometimes lumbrici, sometimes ascarides were voided, after one or two doses. A case is appended of invariable vomiting on taking food, which reduced a young lady to the greatest degree, and which was cured by two doses of turpentine.

—

Mr. Lizars's Contributions to Surgical Anatomy—Hernia.—Mr. L. says, with great truth, that the anatomy of hernia is very various and uncertain. Inflammation and thickening so alter the appearance and relative arrangement of parts, that fascias, which on the unruptured subject, are easily demonstrated, cannot be found in diseased persons; or, perhaps they are enlarged to many times their natural thickness. Sir Everard Home's rule is a good one in cautious and well-tutored hands: he says, divide whatever forms the stricture.

Mr. L. believes, that the crural aperture is as much closed in females as it is in males; and therefore, that the former are almost as liable to inguinal hernia as the latter. This is contrary to our experience. However, it is often difficult to distinguish the one hernia from the other; so that the most skilful surgeons are sometimes deceived. Tumours in the groin have also put on the appearance of hernia, they being complicated with internal or external hernia. Mr. L. mentions a case of the former complication, in which an unsuccessful operation was performed, the tumour being returned, in the belief that it was a hernia; whilst the real hernia was within the abdomen.

It seems that by pressing on the right iliac region of the abdomen, over the caput cæci, fluids may be made to pass through the valve of the colon; at least in the dead body.

The fascia superficialis is so thin as seldom to be worth considering as a separate membrane; and the fascia propria has never been found by Mr. L. either in dissecting or operating. From the various situations of the obturator artery and vein, the blunt-pointed bistoury should not be passed too deep in dividing that portion of the tendon of the external oblique, called Gimbernat's ligament. So, in like manner, the fascia transversalis is a part of the transversalis tendon which passes beneath the spermatic cord.

Mr. L. concludes his paper by recommending a very strong decoction of oak bark (almost an inspissated juice) applied hot, four times a day to a hernia, and the truss immediately after, for the radical cure

of hernia. He has cured hernias, in a few weeks by this method. But, as we know that a friend of ours, an excellent surgeon, has equally cured hernia merely by the constant application, by night as well as by day, of a *well-fitted* truss, we are inclined to doubt whether pressure be not the rationale of the cure even in Mr. Lizars's cases.

—

J. J. Virey, on the Art of being Ill.—We all know that the physicians and the attendants of a patient have a certain duty to perform in the cure of diseases; but few of us recollect, that the patient has equally a part to play, in forwarding the cure. Many persons are not ill, because they have not time to be so: the French revolution cured almost all the nervous diseases of France. Patients, says M. Virey, would be sooner well, if they neither coddled themselves nor were coddled by others: so, many diseases will spontaneously decline and disappear, if they are not attended to.

Moreover, a patient is supplied by nature with several inherent modes of cure. Animals afford abundant instances of this *natural medicine;* and thus in the human subject, a want of appetite exists in cases where food would be improper, and a desire for cooling drinks, in such fevers as are attended by increased heat of the body. Hence, says our author, "nature is our best directress in the treatment of diseases."

The duty of a person, when ill, is, M. Virey says, 1st, to abandon himself to the most perfect tranquillity, both mental and bodily; to reason neither on his complaint nor on any thing else; in fact, to relax into that indolence, that divine *far niente*, which is so delicious in hot climates*—2d, to resign himself entirely to the skill of his physician—3d, to entertain the best hopes of recovery: and hence, surrounding friends should invariably speak and look cheerfully in a sick room. "Hope and gaiety," says our French friend, "are the life of the soul."†—4th, to follow a temperate regimen. The illustrations which M. Virey has given of these principles are very amusing, and at the same time they show, that the principles themselves are really important.

—

Nux vomica.—A patient had a paralytic affection of one side for some years. The nux vomica (in doses of 25 grains of the powder, three in the 24 hours) was given by Dr. Birkbeck, with the effect of producing violent contractions of a painful and involuntary nature, in the muscles previously paralyzed. The dose was therefore reduced to fifteen grains, which agreed well with the patient, and the paralysis was apparently cured.

* Even ignorance and stupidity, sad qualities in health, are excellent ones for a state of disease.

† Hope and good spirits are certainly great matters in the treatment of diseases. A word of comfort, or rather the kind attention of friends, has saved many a life; and it may be recollected, that whilst wounds heal rapidly, and diseases are cured in the hospitals of an advancing army, the reverse takes place when an army is unsuccessful.

Many years ago, Dr. Marcet treated a patient in Guy's Hospital (who had been paraplegic for several years) with the nux vomica. The patient so far recovered under this treatment, as to be able to walk about tolerably well. The same remedy, however, was tried by the same physician in two or three other instances of a similar kind, but without success.

Dr. Baillie has remarked that paraplegia is perhaps very often dependant on disease in the brain. This remark has been confirmed, or at least corroborated, by some cases of the kind which fell under the observation of Mr. Henry Earle, in which there were, from the beginning, some affections of certain nerves of sense, originating necessarily in the brain, and where, in process of time, the upper extremities became paralytic, and finally dissection showed the seat of disease to be in the brain. [*Medico-Chirurgical Review.*

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Cubebs and Capivi.—We have found a combination of these two medicines very useful in the earliest stage of gonorrhœa. Say an ounce of the capivi and four drachms of the cubebs powder, in an eight ounce emulsion, to be taken in two days. [*Ibid.*

—

Sloughing Chancre—A gentleman had a sloughing chancre—that is, a chancrous ulceration assuming a sloughing appearance, and rapidly spreading over the glans penis. In 48 hours one-third of the glans was destroyed. Local bleeding, purging, fomentations, and the strictest antiphlogistic measures had no effect in arresting the alarming progress of the disease. An eminent physician saw the patient. He advised a rapid introduction of mercury, so as to bring on ptyalism as quickly as possible. By extensive frictions, the mouth was made sore in 36 hours. That instant the sloughing ulceration ceased, as if arrested by a charm. We know this treatment is not according to orthodox canons; but it has, since the above case, been tried in several others, and with similar success. [*Ibid.*

—

Crying of the Fœtus in Utero.—This curious physiological fact (if it be one) is as well authenticated as any thing supported on human testimony—at least medical testimony, can be. It has been recently conveyed with its documentary evidence, to one of the first physicians in London, and by him communicated to the Medico-Chirurgical Society. The circumstance took place in Prussia. A lady, during pregnancy, had experienced some distresses of mind, and had had several discharges of the liquor amnii. In the eighth month of pregnancy while in bed; and while several of her friends and relations were supping in her bed-room, the cries of a child were distinctly heard by all present, under the bed-clothes. The midwife being one of the party, and thinking that the child was suddenly born, desired the company to leave the room immediately, and the physician, who was in the house, to be summoned up. The physician was

in time to hear the cries also, which were now unequivocally distinct, in consequence of the bed-clothes being raised. The os uteri was examined, but no dilatation had yet taken place. The cries were now several times reiterated, and then ceased. Labour came on a few hours afterwards, and the child was delivered; a considerable quantity of liquor amnii following the expulsion of the fœtus. The infant was very weak, and died a few hours afterwards.

An explanation has been attempted on the supposition that when the waters escaped, previously to this extraordinary event, air had entered the cavity of the uterus, and thus enabled the fœtus to exercise its vocal powers at a premature period. But such explanation is invalidated by the considerable discharge of liquor amnii at the birth of the child. In fine, notwithstanding the circumstantial evidence and the respectability of the parties concerned, we are forced to withhold our belief of the fact, or rather of the assertion above detailed. [*Ibid.*

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Laurel Water.—This medicine, which is far more certain in its effects and imperishable in its nature than prussic acid, is coming into use in the Metropolis, as it has long been on the Continent, in febrile and inflammatory affections, where farther bleeding is deemed unsafe. It has also been successfully given in puerperal fever. It is made by distilling two drachms of the fresh laurel leaves chopped, with four ounces of water, recommitting the distilled water twice afterwards on the same quantity of fresh leaves, and making ultimately four ounces of the menstruum. From thirty to sixty minims of this is given every four or six hours, till a completely sedative effect is produced on the system, and the febrile and inflammatory symptoms are subdued.

A physician-accoucheur of considerable practice in this metropolis, has, for nearly two years past, been in the habit of treating puerperal fever, after one or two copious bleedings, with digitalis in large doses—two or three grains every three or four hours, till the increased action of the vascular system is completely quelled. We recommend a trial of this plan. [*Ibid.*

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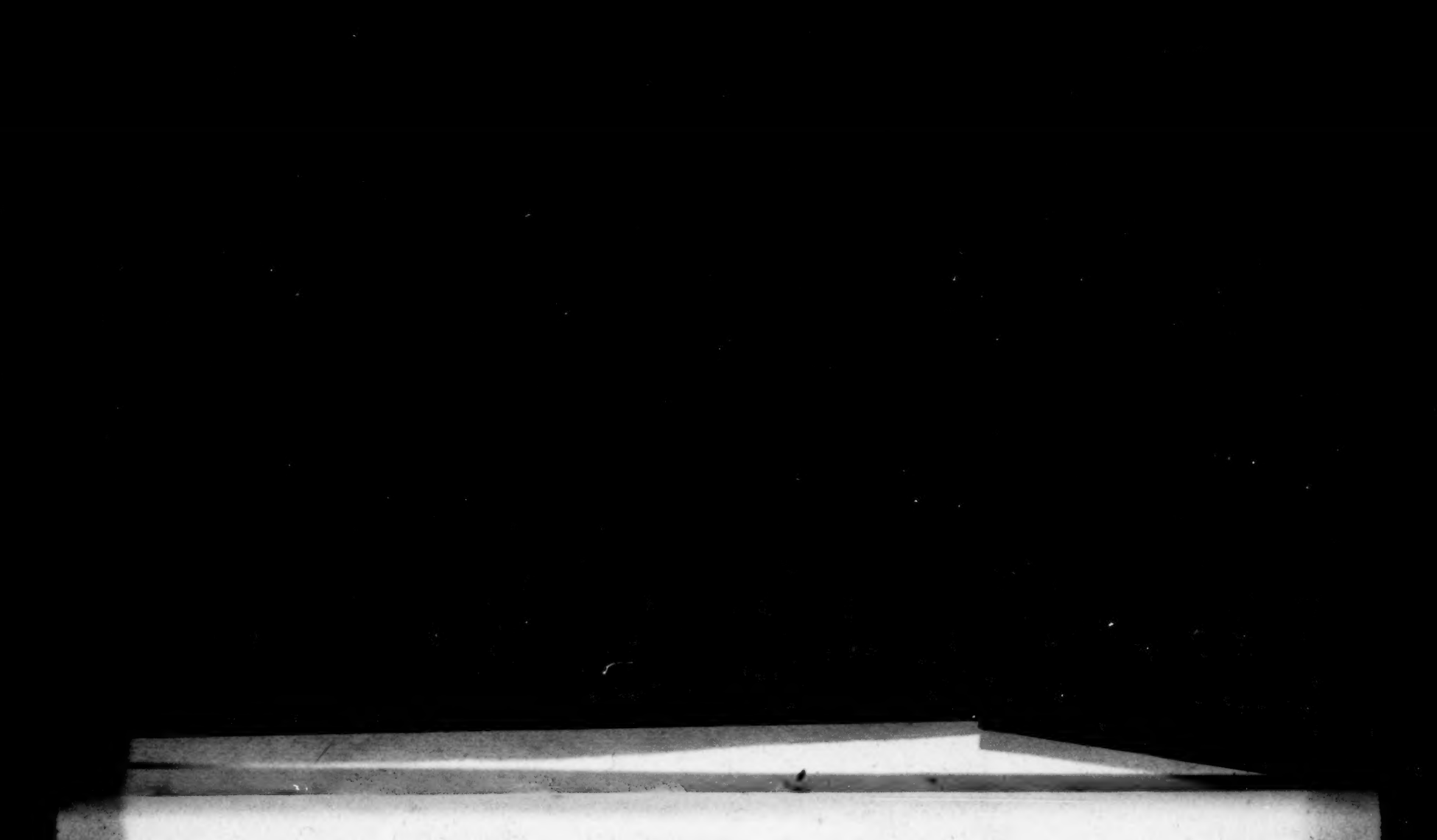
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